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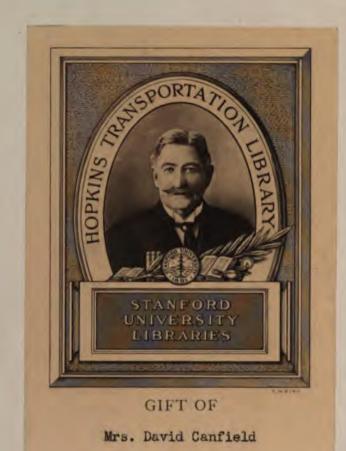
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# The Horseless Age

First Automobile Journal in the English Language

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### Exhaust Gas Analysis.

By Albert L. Clough.

Most of the readers of The Horseless Age will recollect the publication in the issue of January 1 and January 8, 1908, of an abstract of a paper by the eminent authority Dugald Clerk upon "The Principles of Carbureting as Determined by Exhaust Gas Analysis." This article treats of the information which is afforded as to the quality of fuel mixture furnished a motor from a determination of the chemical constitution of the exhaust, and is well worthy of a careful rereading by all who are interested in the problem of carburetion.

Since this paper was published the interest taken in carburetion by carburetor manufacturers, automobile builders and by the motoring public has immensely increased, and its solution is now being sought in a much more scientific spirit than formerly.

It is safe to say that exhaust gas analysis will be very largely resorted to in the future, as furnishing the most reliable criterion as to the quality of fuel mixture being furnished any given motor, and that this chemical method of gaining information upon the carburetion question will become one of common application in carburetor factories and automobile plants.

A brake test of a motor furnishes sufficient information as to its output, and a brake test during a period of time, in conjunction with corresponding measurements of fuel consumed, suffices to determine the fuel efficiency of the motor. However, unless determinations of exhaust gas constitution accompany such a test it is impossible to be certain that the fuel efficiency realized is the highest attainable from that particular motor. There may be a considerable rejection of carbon monoxide, a considerable emission of other unburned fuel in the form of hydrocarbons or hydrogen, and there may be an undesirable excess of oxygen.

### CARBON MONOXIDE.

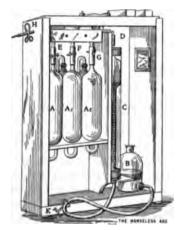
Carbon monoxide is valuable fuel, being a chief constituent of producer and blast furnace gas. It is the result of the incomplete oxidation of carbon, and its complete combustion to carbon dioxide sets free about 30 per cent. as much heat as does the complete oxidation of the same weight of carbon. Its rejection unburned in the exhaust is not only so much waste of good fuel, but its poisonous properties render it a serious menace to health. As the use of motor vehicles increases it may be expected

that the emission of carbon monoxide may be recognized by law as dangerously unsanitary, especially in crowded city districts, where automobiles congregate in large numbers.

The rejection of unburnt gases or vapors rich in hydrogen is an obvious waste of the grossest kind, for hydrogen possesses a thermal value roughly four times as great as that of carbon.

### EXCESS OF OXYGEN.

If a too great excess of oxygen be present in the exhaust there will be nearly five



THE ORSAT APPARATUS.

times that quantity of excess nitrogen there, and the presence of this large quantity of gas, which is inert so far as the combustion is concerned, necessarily reduces the maximum temperature attained during explosion, and acts, in a way, to reduce the effective volume of the cylinders.

Exhaust gas analysis not only throws light upon carburetor performance, but may also furnish information as to the efficacy of ignition devices, and as to whether these are advantageously placed in respect to firing the charge most effectively.

It is not a very difficult matter if the proper apparatus is at hand for any intelligent person to make at least partial analyses of exhaust gases. There is no necessity for sending exhaust gas samples to a regular chemist unless some very unusual determination is required. A gas analysis apparatus of the Orsat type in the hands of an ordinarily careful person will give suffi-

ciently close indications of the carbon monoxide and excess oxygen present with very little labor. The Orsat apparatus is frequently to be found in the possession of the steam engineering departments of large plants, where it is used for analyzing the chimney gases leaving the boilers, with a view to effecting economies in coal consumption.

### THE ORSAT APPARATUS.

The principle of this apparatus is as follows: A sample of the gas to be analyzed, of a known volume at known pressure and temperature, is placed in a graduated glass cylinder or burette. Means are provided for transferring this measured quantity of gas successively into vessels containing certain solutions. One of these solutions absorbs the carbon dioxide present, and after the gas has been in contact with this solution for a sufficient length of time it is drawn back into the measuring burette, and the difference between the volume then present and the initial volume represents the proportion of carbon dioxide in the sample. The same procedure is carried through to determine the oxygen present by transferring the remainder of the sample into the presence of a solution adapted to absorb it, and then returning it to the burette, when the difference in volume before and after absorption gives the proportion of this gas. Exactly the same manipulation is resorted to for the purpose of determining the proportion of carbon monoxide present. After these three gases are removed from the sample by absorption the remaining volume consists of nitrogen and whatever combustible gases or vapors (other than carbon monoxide) the sample may have contained. These combustibles require subsequent treatment in another apparatus.

A portable form of the Orsat apparatus is shown in the accompanying figure. Here C is the measuring burette, usually of 100 c. c. capacity, which is surrounded with a water jacket that tends to prevent changes of temperature. A, A<sub>1</sub> and A<sub>2</sub> are double pipettes, the rear bulbs of which are only partly shown in the background, as are also the connecting tubes just below the bulbs. The outlets of the back bulbs are fastened into the necks of extensible rubber bags. From the upper end of the burette is taken off the capillary tube D, which turns at a right angle and passes horizontally over the three pipettes, giving off branches which communicate with each. These branches are closed, respectively, by the pinch cocks E, F and G. The extreme end of the horizontal capillary tube is closed by the pinch cock H. B is a bottle of water connected to the bottom of the burette by means of a rubber tube, upon which the pinch cock K may be closed.

### METHOD OF MAKING TEST.

The sample to be analyzed may be collected in a metal cylinder by allowing the exhaust to circulate through it until the air originally contained in it has been entirely displaced. The connection can usually be made at the cut-out valve or with the piping used to operate an exhaust horn. If the sample is to be immediately operated upon a rubber gas bag may be used to collect it in, but the gas must not be allowed to enter the bag at too high a temperature.

Before introducing the sample into the burette the cock H is opened and the bottle B raised until the burette and the connecting tubing are filled with water. H is then shut and the vessel containing the sample is attached to this tube. H being opened and the bottle B lowered, about 100 c. c. of the sample is sucked into the burette C, taking the place of the water, which runs back into the bottle B. H is then closed and the amount of gas in the burette is adjusted so that it measures exactly 100 c. c. when the bottle is held so that the level of the water therein is exactly the same as the water level in the burette.

The double pipette A contains a solution of caustic potash, and the sample is first admitted to this vessel by opening the cock G and raising the bottle so that the entire measured volume of gas in the burette is forced thereinto. A portion of the liquid in the front bulb of pipette A is thereby forced over into the back bulb, and the displaced gas in the back bulb partly fills the rubber bag. Glass tubes arranged in the front bulb are exposed to the sample by the recession of the solution and aid in effecting absorption. The carbon dioxide present in the sample unites with the caustic potash to form potassium carbonate, and thus disappears. By raising and lowering B the gas may be moved into and out of A, and after a few such manipulations the levels in B and C should be made to coincide, and a reading should be taken after time has been allowed for the walls of the burette to clear themselves of water. This preliminary reading having been noted, the gas should again be entirely forced into A and the same procedure repeated, and the levels of the water in B and C again equalized. If the reading then obtained is the same as the preliminary reading all the carbon dioxide has been removed, and the difference between the volume now noted and 100 is the percentage of carbon dioxide in the sample. If the two readings do not agree the sample should again be forced into A and returned to C until agreement between successive readings is obtained. Cock E is then shut, with the water levels in B and C equalized, and cock F, opening into pipette A1, opened. This pipette contains a solution of potassium pyrogallate,

rendered slightly alkaline, which has the property of absorbing oxygen. The remainder of the sample is forced into and out of this pipette, exactly as above described, until two successive readings of the gas remaining in the burette C agree—the water levels in C and B always being the same when a reading is taken.

After absorption in A<sub>1</sub> is complete the difference between the then reading and the reading after the absorption of the carbon dioxide gives the percentage of oxygen in the sample. Cock F is then closed and cock G, connecting with pipette A2, is opened. This pipette contains a solution of acid cuprous chloride, and has the property of absorbing carbon monoxide. The remainder of the sample in the burette is forced back and forth into this pipette until successive readings check very closely, and the difference between the reading thus arrived at and the reading after complete oxygen absorption is the percentage of carbon monoxide in the sample.

The portion of the sample remaining in the burette after these three determinations consists mainly of nitrogen, but there may be mingled with it combustible gases which have failed to burn within the cylinder. It appears, however, that there is little or no hydrogen, hydrocarbons or compounds of the marsh gas series present when there is little or no carbon monoxide found in the exhaust, and that, on the other hand, as the carbon monoxide content increases the proportion of combustible gases increases. For ordinary purposes, therefore, it is not necessary to determine the amount of combustibles in the exhaust, but it may safely be assumed that if carbon monoxide is present in more than minute amounts combustible gases are also being wasted at a rate somewhat proportionate to the amount of carbon monoxide rejected. The determination of the carbon monoxide content of the exhaust is thus the main thing, and the presence of this gas is conclusive evidence of the incomplete combustion of carbon. It is a pretty sure thing that if the carbon in the mixture is imperfectly burned the hydrogen will also be partly rejected unconsumed.

### UNBURNED COMBUSTIBLE.

It is possible, however, to determine the amount of combustible which is left mixed with nitrogen in the Orsat apparatus. The remainder of the sample may be transferred to an explosion bulb and a known volume of pure oxygen added to it, the total volume being measured. The mixture is then fired by a jump spark, and from the reduction in volume and the known amount of oxygen added the volume of combustible may be obtained after the carbon dioxide produced by the combustion has been allowed for. This determination, if required, as is unlikely to be the case, may with advantage be left to a professional chemist.

The determination of carbon monoxide is, however, an easy matter, and furnishes nearly all the information needful as to the degree of completeness of the combustion. A too great excess of oxygen is also plainly indicated, if present, by the same test. Some excess is, of course, to be expected.

### The Automobile Insurance Field.

By J. E. JENNINGS.

The automobile insurance field is evidently regarded as worth cultivating by the various companies, fire and casualty, which are looking for paying business. The subject of rates is, of course, paramount with the managers of the insurance companies. The cutting of rates, for instance, is not viewed with favor, and there is a petty war between some of the companies, as previously mentioned in The Horseless Age.

The manager in New York city for the American Fidelity Insurance Company of Montpelier, Vt., has sent out a new schedule of liability rates formulated by the company. These rates are based upon the insurable horse power, and start, for steam and gasoline pleasure cars, at \$30 premium for 12 to 16 horse power, and for each additional horse power thereafter the rate is advanced a dollar. These rates are, it appears, quite a little lower than the figures of nearly all other companies writing this class of hazard, particularly as regards the high powered cars, as the company claims that, based on its experience, the loss ratio on the larger cars is not as high as on the higher powered cars. It is noted that the company makes a further reduction of \$5 from the above named rates for cars which are operated outside of Greater New York, Boston and Chicago, and has introduced a new feature by quoting a premium rate of \$20 for motorcycle liability.

Following the promulgation of the American Fidelity's schedule a meeting was held at the offices of the Ocean Accident Insurance Company in New York by representatives of casualty companies writing automobile collision insurance for the purpose of arriving at some agreement as to the basic rate to be charged and the extent of coverage to be given. Nothing definite was done, but the subject was thoroughly discussed. The result of further conferences is shown in the new schedule printed in The Horseless Age of June 16.

The Travelers Insurance Company of Hartford, Conn., has begun to write automobile collision damage insurance. The Commercial Union Assurance Company began last month to write automobile insurance business.

FIRE INSURANCE COMPANIES INTERESTED.

The fire insurance companies intend to have a share of the automobile insurance crop. The Board of Fire Underwriters at Chicago, Ill., recently ruled that insurance on automobiles is fire insurance. Heretofore this form of insurance has been classed as "inland marine," inas-

much as the policy used covers collision, transportation and theft. The Legislature of Missouri has amended the law governing fire insurance companies so as to permit them to make all kinds of insurance on automobiles. Last year the companies were notified that they must stop the issuance of policies which indemnify against loss by theft in addition to the fire loss, because the law as it stood did not contemplate the first named kind of insurance.

So important, or, rather, so rich, is the automobile insurance field regarded by insurance companies that in a couple of cases steps have been taken to have the companies' charters amended by legislative enactment so that they could secure a share of the business. The Ætna Fire Insurance Company of Hartford is one of these companies.

#### BONDING CHAUFFEURS.

The bonding of chauffeurs is advocated by insurance men. It has been suggested that every chauffeur should be required to provide the bond of a surety company in a penalty of not less than \$2,500, upon which bond, to the amount of its penalty, a right of action should exist in favor of anyone sustaining damage to person or property by the negligence of the chauffeur. This, it is argued, would open a new field for activity to the surety companies, and the idea should be acted upon by them. It is claimed by those in a position to know that any company now writing bail bonds for the owners of automobiles could with little or no difficulty build up a good income from the sale of these bonds for chauffeurs to the drivers themselves. This tentative proposition has not so far been pushed, but perhaps it may be incorporated in a bill to be presented to the next meeting of the Legislature.

Auto Imports of Last Fiscal Year. The United States during the last fiscal year, which ended on June 30, imported 1,987 automobiles, valued at \$4,311,295.99, as compared with 1,415 cars, valued at \$4,111,225.43, during the fiscal year 1907-8, and 1,435 cars, valued at \$5,099,005.87, during the fiscal year 1906-7.

Wheeler & Schebler, Indianapolis, Ind., have donated a cup to be contested for on the Indianapolis speedway. It is said to be the largest trophy of the kind ever made, being about 81/2 feet high and weighing some 500 pounds. It was made by Tiffany, of New York, and is decorated with appropriate automobile designs. The trophy will be competed for in international stock car events on the speedway, and will become the permanent possession of the company winning it three times. It will be exhibited in a number of the large cities. starting with Detroit, where it will be shown during the week preceding the start of the Glidden Tour.

### Manufactured Versus Assembled Cars.

By CHESTER S. RICKER.

One frequently hears the statement that "our car is built entirely in our own shops." The question which immediately arises is, what a advantage is it to the buyer when cars are so manufactured? To consider this question fairly, we must look at both sides of the subject and consider what is meant by the terms "manufactured" and "assembled."

#### MANUFACTURED CARS.

Shall we say that one car is manufactured and another is not, merely because the maker of the former makes his own castings while the latter does not? I do not think so. It depends on where the machine work is done, for, whether one does or does not make his own castings, he must do all his machine work if he aspires to the reputation of being a manufacturer. Further, outside foundries which specialize can do much better work than the average automobile manufacturer who attempts it. So, unless we consider the latter type as representative, we might as well go back to the steel manufacturer and the remainder of raw material producers. Besides, it is the accuracy of the machine work which determines those advantages most sought for by the buyer, such as smooth running, long life and interchangeability. Furthermore the prime cost depends very little on the price paid for the castings, as compared with the expense of the machine work which follows. An automobile chassis upon which all machine work is done in the factory of the builder may therefore be called a manufactured car.

### ASSEMBLED CARS.

Opposed to this we have the so-called assembled car. That an assembled car can be made a success is beyond question, for at least a dozen of the prominent manufacturers of today began by assembling and even continue to partially assemble their cars. Of assembled cars there are two kinds, viz., cars built from parts obtained in the open market, and cars built by some well established firm, the volume of whose orders requires the co-operation of the various parts makers. The former type is the one which has brought the assembled car into disrepute. As a rule, after a few lots of cars are sold it is almost impossible to get replacements. The reason for this is that such companies are not able to invest large sums of money in the spare parts department, so, together with the buyer, they are at the mercy of the parts maker. Furthermore, if a replacement is required while touring it might be weeks before one could get the part. The inability to quickly obtain interchangeable spare parts has probably done more harm to the assembled car's reputation than any other one thing. The highest type of assembled car is one the parts of which are made by parts makers but the elements of which have been specially designed by one head and form a harmonious whole.

### ADVANTAGE OF MANUFACTURED CARS.

Following are the principal advantages which are claimed for the manufactured car. First, the builder has the deepest interest in every detail during construction, while, on the other hand, the parts maker may not have any particular interest in the assembled machine, especially if the car is produced by a small and obscure company. But the contrary is equally true, as may be seen from advertisements of leading parts makers.

Since the manufactured car is designed and constructed under the supervision of the factory staff we have a unified product. Slight changes which tests and tryouts indicate to be desirable can very easily be made, a refinement which would be impossible if the parts were bought in the open market. Thus each element of the design can be made to harmonize with every other and the whole. Likewise, the material entering into the makeup of the machines can more easily be checked as to quality.

As a large outlay for machinery is necessary for the manufacture of a car, only those firms which have good financial backing can afford to equip a factory to produce every part themselves. Once the investment is made there is every incentive to keep the plant going and make the investment which it represents pay for itself. Hence, although it requires more capital this plan conduces to a healthier and more energetic organization, because there is a factory behind it. With this we have essentially what every maker is striving for, viz., permanency.

Where a concern is once permanently established the buyer does not have to ask "What will I do in a year or two when I want a replacement?" The manufacturer could answer this question by saying that if he did not have the parts in stock he had his own patterns, jigs and dies, so that he could give the customer what he needed. The advantages of the manufactured car can be summed up in three words: replacements, interest and permanency.

### THE ASSEMBLED CAR.

"There are tricks in every trade," according to an old saw, which came to my mind recently when I learned that two identical assembled chasses sold by separate firms differed by over a thousand dollars in selling price. The costlier had a year's guarantee, but was it worth the premium? However, recently it was my fortune to visit the factory of a popular car built on the assembling plan. My first inquiry was as to the methods adopted to protect the buyer. After thorough investigation of these I was convinced that a car so assembled is on a par with cars of its class that are "manufactured." A de-

scription of the methods of this assembling firm may be of interest.

The cars are designed at the firm's factory, and by their own engineers. The experimental models are built and tried out, and any changes deemed necessary are made before even one is delivered to the public. The company own all their own patterns, jigs and dies, and their orders are so large that the parts maker has to make the smallest alteration that the engineering staff may prescribe.

Making its own designs and owning its own patterns, etc., replacements can be produced at some late period when the present model is long out of date and no parts remain in stock. A special lot of spare parts, however, are kept in stock. Also, it should be noted here that the engineering as well as the bookkeeping department keeps a careful record of the replaced parts in each model. If at any time more than 2 per cent. of the models already on the road require replacements of the same parts, the reason is found out and the defect remedied. With respect to ability of furnishing replacements, this firm at least is equal to the best manufacturers. The company have from fifteen to twenty inspectors in each factory where parts entering into the construction of their car are made. These inspectors, being paid by the parent company, and having no interest in the manufacturing firm, subject the parts to more severe tests than they might in their own factory.

Finally, the most serious question which confronts the buyer is, Which car has the most money value? The question which now confronts us is whether the assembler can give the buyer as good a bargain as the manufacturer. From actual statistics this firm found that even paying the parts maker a profit the motor and transmission parts cost no more than if built by them. The reason for this is evident when one considers that the overhead charges would be much higher per motor if it were placed on this lot of motors alone than if spread over those of a dozen other firms. Frames, axles, etc., are made to special designs by the parts makers for the majority of large manufacturers, so that in this respect the assembled car does not differ from the built one. In my opinion, therefore, the car assembled as outlined in this article is the equal of the manufactured car with regard to money value and satisfaction to the buyer, for in both cases we have the three requirements-replacements, interest and permanency-fulfilled.

A publicity item is making the round of the press to the effect that a Kansas banker bought a certain make of car after having seen only a photograph of the machine, "so fascinated was he by its appearance." The banker probably realized that his knowledge of mechanical constructions was a vanishing quantity, and that an examination of the "innards" of the car would not have aided his judgment in the least.

# The Work of the Examiners and Investigators of the Automobile Department of the Massachusetts Highway Commission.

### By H. H. Brown.

The automobile law of Massachusetts makes it the duty of the State Highway Commission to register the automobiles used within the State and to issue licenses to the operators thereof. While the Massachusetts motor vehicle law is quite specific in the more important details, the circumstances vary, and there are many points which are not referred to. The Highway Commission is, however, empowered to make rules which do not conflict with the general provisions of the law, and among the duties of the commission is the issuing of licenses for both private and professional operators and the revocation of same for cause.

To assist the commission in these duties the law provides for examiners and investigators. The duties of these officers are to examine and pass upon the fitness of the applicants for licenses and to investigate all automobile accidents with a view to placing the blame, and also flagrant infractions of the automobile laws. The commission is kept informed of accidents and cases of infractions of the automobile law from three sources, viz., by direct report to them, by court records, which according to law must be reported to them, and by the services of a press clipping bureau.

The time of one of the investigators, who has his headquarters in Boston, is given solely to the investigation of violations of the law and accidents. Another investigator looks after the accident cases in the western part of the State as well as the examination of applicants for operators' licenses. The time of two others, with headquarters in Boston, is almost exclusively employed in the examination of operators. These officers are given the powers of police officers and constables, and may testify before the commission, which sits as a court in cases of violations of the automobile law.

The largest part of the work of the officers is the examination of applicants for professional operators' licenses, or, as the law reads, "operators for hire." Private operators are required to undergo an examination only in exceptional cases, as when they are under 16 years of age, the fact as set forth on their applications being deemed sufficient warranty of their fitness to operate. This was also formerly the case with professional chauffeurs, but as can be readily expected this leniency was in many cases abused and a system of examinations was made necessary. This examination comprises a written or theoretical part and a practical examination in the driving of a car. Originally the written examination consisted of a set of twenty-five questions, nine of which were on the operation of a garoline motor, and the re-

mainder on the automobile law and rules of the commission. It was found that answers to these questions were learned by many of the applicants from others who had taken the examination, therefore at present about ten questions are asked, the majority having reference to the automobile law and the rules of the road, only one or two being on the operation of a car. These questions are eminently practical, and no intelligent person need have fear of failing in this part of the examination if he has read the pamphlet on the laws and the rules of the commission which are furnished to each applicant for a license. The list of questions is frequently changed and a fair example is as follows: What is considered prima facie evidence of excessive speed in the built up portion of a town or city? State three infractions of the automobile law which may be punished by imprisonment. What causes back firing in the carburetor of a gasoline motor? What would you do in descending a hill if your brakes failed to work?

At the time set for the other part of the examination the applicant must report at the offices of the commission with a car with the operation of which he is familiar. Then, accompanied by an examiner, the operator is instructed to drive over a route passing through a congested section and embracing the descent of a steep hill. Without warning, the examiner instructs the operator to stop at a letter box or other similar point and to back the machine around the corner of a side street, when a return trip to the commission's office is made. During the examination the examiner has noted the care exercised by the operator on approaching street crossings, in selecting a time for the use of the horn, the use of the brake in descending the hill and the observance of the rules of the road, especially in rounding corners. It is also noted by the examiner whether the operator is able to concentrate his attention on the surrounding traffic instead of on the control mechanism of the car. Cautious driving, if carried to excess, is looked upon with more favor by the examiners than so-called showy driving, even if the applicant shows considerable skill in the handling of the machine.

The Danish A. C. held an endurance contest "all around Zealand" over a course 423.8 km. (265 miles) in length. The contest was open to touring cars owned by members of the club. The cars were started at half past 3 o'clock a. m., and none of the contestants were allowed to check in at the finish before 5 o'clock p. m.

The Government authorities at Bombay have made arrangements with a French firm to place 100 first class and fifty second class taxicals on the streets of the city, and a similar arrangement has been made with regard to Madras. This does not preclude other owners from putting taxicabs into service.

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### Injudicious Haste in Marketing New Models.

A former Chicago automobile dealer, who has spent the last two years abroad and has just returned to his home city, announces a determination to put the automobile business on a higher plane, and in an advertisement in a Chicago Sunday paper gives an outline of his plans. In making an analysis of the automobile business in this country he observed three serious evils, for which he believes he has found effective remedies

A comparison of the best American and European cars has led him to the conclusion that the latter are considerably better than the former, and this because the European manufacturers work more slowly, develop their cars step by step, and do not experiment at the expense of the public. Another thing with which he finds fault is the high selling expense. He says that he can see no reason why a dealer disposing of 100 cars in a year should need to spend from \$65,000 to \$75,000 annually in running his business, and why a car costing

\$1,500 to manufacture should have to be sold at \$4,000 or more to the public. The "commission evil" between chauffeurs and people who sell automobile supplies is also scored. We will consider here only the first of the points made.

The comparison of American and European cars would have been more correct had it been based on average cars. instead of the best of each class. It is certainly not fair to imply that the best American manufacturers throw immature models upon the market and experiment at the expense of the public. They certainly do not. Of course, such things are being done at present, and by manufacturers, too, who, on account of very large output, occupy a very prominent position in the industry, but they are generally newcomers, and certainly cannot rightly be classed among the best manufacturers.

We have had quite a number of examples in recent years of cars being designed "from the bottom up," models built and duplicates delivered to the public within six months' time. The manufacturing plans are generally completed at the time the designing work is begun, and practically no time is left for extended road trials to bring out any inherent faults in the design, so as to be able to correct them before the manufacture of the first lot of cars is begun. Under these circumstances it is not surprising that we frequently hear of annoying delays in the delivery of new models, owing to some part having been found inadequate, necessitating new dies or patterns being made involving serious financial

One of the reasons for this haste is that promoters of new companies will not admit the necessity of experimenting. Such an admission might "scare off" both prospective investors and prospective agents and buyers. But the advisability of giving each feature of a new car a thorough tryout before proceeding to order parts is well shown by the policy pursued by most of the old established manufacturers. They usually make only minor changes in their models from year to year; nevertheless, they submit their new models to road tests often extending over several thousand miles, to bring out any flaw that may exist in the design. If such searching tests are necessary in the case of models which are merely changed in detail, how much

more necessary they are in the case of absolutely new designs!

However, it is not merely because the dollar looks more omnipotent to the American than to the European-as the above quoted dealer asserts-that the American manufacturer proceeds more hastily than his European confrère. The rapidly changing market conditions in this country undoubtedly have a strong influence on the method of developing and marketing new models. This is partly due to the fact that entirely new markets are still being opened in the United States, new sections of the country being invaded by the automobile, and new classes of the population becoming converted to its use. In the chief automobile countries of Europe the markets seem to have been developed to their utmost. This difference accounts for the present great activity of the automobile industry in this country, in contrast with the relative stagnation in the industry abroad. When new sections of country or new classes of users have to be supplied slight changes in the types of vehicles must often be made, and whoever is the first to offer a suitable vehicle will find the best outlets. Consequently, the haste in developing new models is partly accounted for by the fact that in this country the automobile business is still in the ascendancy, while abroad it has passed the zenith. After market conditions have once become settled in this country there will be less haste in getting new models on the market, and the evil consequences of such haste will be avoided.

### Authority of Cities to Regulate Taximeters.

That taximeters should be placed under some form of legal supervision in order to insure a reasonable degree of accuracy of the charges for transportation is generally conceded. The taximeter is in the nature of a measure and should be subject to inspection, the same as are weights and measures used in the ordinary barter and sale of commodities. However, it is something more than a measure, and unless a city possesses express authority to regulate measuring instruments combined with a mechanism of mathematical computation of either prices or charges, any ordinance passed under a charter power to regulate weights and measures will be void. In

other words, legally the taximeter cannot be placed in the same category with the ordinary scales and measures which are to be found in stores.

New York city was the first municipality to enact a comprehensive scheme for the regulation of taximeters. The city charter expressly provides that the board of aldermen shall have power to pass ordinances in relation to the inspection or sealing of weights and measures (see Sec. 49, p. 39), and it would seem, perhaps, on first thought, that this charter authority is broad enough to give legality to the action of the city. The above applies equally to other cities in the United States. It will be particularly noticed that the charter limits the powers of the aldermen to the regulation and inspection of the two named classes of instruments. Inasmuch as the taximeter is something more than a measure, to wit, a measure plus a calculating apparatus, it does not legally come within the statutory authority of the city. Municipal corporations have only those powers in respect to police regulations of this character which are expressly conferred by the charter or some other statute. There is no general authority under the police powers to enact such ordinances restricting the use of property.

The authority of municipalities to regulate weights and measures, by providing for their inspection, necessarily implies that there must be a comparison made with some standard established by law. There is now no standard established by statute for the purpose of testing taximeters, and it is not within the power and authority of an inspector to establish such a standard for himself. The standard for the purpose of testing weights and measures must be established by law. All of the various States have established a standard foot, yard, etc. The United States Government has also established standards of measure which have been copied by the States. The establishment of a standard of comparison must, therefore, necessarily precede the establishment by law of a system of inspecting measures.

The above assertions are borne out by the decision in the case of Parker v. Webb, 121 N. W. Rep. 322, which holds that the charter provision of the city of Detroit, authorizing the common council to regulate weights and measures to be

sealed by the city sealer, so as to be made comformable to the standards of weights and measures established by the general laws of the State, does not authorize an ordinance requiring the city sealer to determine the accuracy of computing devices on scales of merchants by which the value of the goods weighed is to be determined.

The taximeter being a new kind of measure will require a new kind of standard, if we are to have this instrument officially inspected and sealed. The remedy is in the Legislature.

# Special "Low Wattage" Tires for Electric Vehicles,

Possessing a radius of action not more than one-sixth that of the average gasoline car of the same type, the electric vehicle must be so designed that the energy stored in its battery shall be expended with the utmost economy. Particularly is this the case in view of the fact that as many hours are required to replenish the battery charge as are minutes to refill the gasoline tank. Not only are all moving parts of the electric car mounted upon anti-friction bearings, the greatest care taken to eliminate friction in the transmission and the utmost attention paid to flexibility of the running gear, but special pneumatic tires have been developed for this service which greatly reduce the traction resistance and economize the charge in a very marked

These tires are exceedingly thin walled, and so constructed as to dissipate but very little energy in the form of internal work. They are mostly of a special single tube or "hose pipe" style, although they have recently been developed in the conventional detachable type. "Low wattage" tires, as they are called, by virtue of their extreme resiliency, conserve a large amount of energy which regular tires dissipate, and the mileage per charge of a vehicle equipped with them is very considerably augmented.

The low speeds at which electrics are ordinarily operated, and the generally easy service which they are put to, as compared with gasoline cars, render possible the application to them of these thin walled and somewhat fragile tires, and many of the high mileage records which are reported are made possible through their use. They are, however, extremely liable to puncture and to other forms of failure.

The owner of an electric vehicle in choosing his tires is called upon to make

the following decision: Whether, by the use of low wattage tires, to increase his mileage and lessen his outlay for electric current, and at the same time subject himself to the liability of delays due to punctures on the road and to the additional tire cost arising therefrom, or to use standard tires and be satisfied with a more moderate mileage and the assurance of a comparative freedom from tire troubles.

It is quite possible that certain circumstances of use might render each of these courses in turn advantageous. Where electrical energy commands a very high price, and road conditions are favorable to tires, it might prove a paying proposition to use low wattage tires, while under conditions of very cheap electricity and roads destructive to tires the use of standard casings and tubes would be distinctly indicated. It seems quite probable that there is a field for these special tires in connection with the electric vehicle, for with it economy of energy is an all important factor.

The French Minister of Finance plans to raise 9,000,000 francs by placing an internal tax of 5 francs per hectolitre on gasoline of a density less than 0.765, on benzol, benzine and toluene. The same import tax is to be placed on benzol as is now exacted on gasoline.

### Coming Events.

July 4-17-Endurance Test, Automobile Club of Sweden.

July 8-Taylor (Tex.) Track Meet, Taylor Fair Association.

July 10—Santa Monica (Cal.) 200 Mile Road Race, Southern California Automobile Dealers' Association.

July 12-Detroit (Mich.) Sixth Annual Tour, A. A. A.

July 17—Paterson (N. J.) 100 Miles Sealed Bonnet Contest, New Jersey A. C.

July 31—Kansas City (Mo.) Race to Elm Ridge Park, Kansas City A. C.

August 5—Algonquin (Ill.) Fourth Annual Hill Climb on Algonquin and Perry Hills, Chicago M. C.

August 31 or September 30—Milwaukee (Wis.)
Annual Orphans' Outing, Milwaukee A. C.
September 6-11—Lowell (Mass.) Annual Motor

Carnival, Lowell A. C.
September 15—Denver (Col.) Start of Flag-to-

Flag Race to Mexico City, Denver M. C.
October 7—Philadelphia (Pa.) Second Annual
200 Mile Stock Chassis Race in Fairmount Park,
Quaker City M. C.

November 6 to 13—National Automobile Show under the auspices of the N. A. A. M. at Atlanta,

December 29-30—Philadelphia (Pa.) Annual Midwinter Endurance Contest. Quaker City M. C. December 31 to January "New York City Annual Show, Grand Central Palace, American Motor Car Manufacturers' Association.

January 8 to 15—New York Annual Show, Madison Square Garden, Association of Licensed Automobile Manufacturers.

January 29 to February 5, 1910—The Ninth Annual National Show at Chicago, Ill.

### The Scottish Reliability Trials-II.

BY ROY LINDSAY.

WEDNESDAY, JUNE 16. s day's route, covering 173 miles, rised a circular trip from Inverness to the extreme northwest of Scotthen south and east, back again to arting point. About one-quarter of the ice was over well surfaced main roads, e remainder was up and down mounus tracks only open to traffic for some months of the year, the snowdrifts entirely disappearing until the mid-May, Such evidences of civilization am road rollers are never seen in this of the country, as it would be imposfor the machines to get up the hills, besides, there is very little wheel trafne population being more sparse than by other district in Great Britain or nd. The difficulties of the day were ased by the narrowness of the track, after mile only giving barely room ne car to traverse, and the atrociously surface resulted in more punctures on any other day in the week, stopfrom this cause being frequent. As ars traveled in very close order, no than fifteen vehicles were stopped by gle puncture on one occasion, passing stranded car being quite impossible. ne point there was no conflict of opinviz., that for variety of scenery this far outstripped all viewed on any of our preceding years. There was one nuous ascent from sea level for nearly es to a spot 2,000 feet above sea level. was among the Fannich Mountains, from their height are popularly n as the Scottish Alps. Here the cars actually above snow level, which never ly melts so far north, and when the as reached snow was still lying around vas visible in many directions.

timed climb on this day took place minard Hill, 1,775 feet in length, with al rise of 226 feet, the grade varying 13 per cent. to 16 per cent, Every eached the top without trouble. One ar mishap to a car after the timed was due to a punctured float in the retor, which the driver repaired in y-three minutes, but which cost him of nearly eighty marks. Another car ed from breakage of nearly every leaf front spring; that was patched up by and mechanic, but necessarily ind heavy penalization. Another mishat occurred the first day illustrates olly of cars following each other too y in an event of this character. While rsing a rough road covered with loose s, a large one was thrown backward such impetus by the wheel of the ig car that it hit the radiator of the vehicle and caused so much leakage tops had to be made every two hours up with water. A complete new rawas telegraphed for, sent up from on and replaced the leaking one; such though permitted by the rules, meant

not only a penalty according to the time occupied, but also the loss of the whole of the reliability marks that could have been secured for the day and would put the car right at the bottom of the list.

Forty-seven cars secured non-stop records for the day, and in the timed climb most all that had done well on Cairn o' Mount repeated their performances. Despite the severe work, the little cars in Classes A and B were the feature of the day, seven of them obtaining full marks for reliability, a really astonishing feat that was quite unexpected and indicates the enormous improvement that has taken place in small powered machines in the last twelve months.

THURSDAY, JUNE 17.

The route of this day, 1741/2 miles, was quite an easy one compared with the previous day, much of it being alongside of a series of entrancingly beautiful lakes that were joined up artificially eighty years ago, and now bear the name of the Caledonian Canal. Still another timed climb took place quite early in the morning, 34 miles from the starting point, at Glendoe Hill, having a length of 2,940 feet, with a total rise of 390 feet, and an average grade of 13 per cent. Although the average appears easy, much of it is actually steeper, there being several pitches of 20 per cent. grade and a few yards of 22 per cent. The small cars in Classes A, B and C were excused from the climb, and although one or two might have succeeded, it was considered advisable not to subject them to the tests. The sensation of the day at the hill was the ascent made by the 30 horse power Adler, many seconds faster than any other car. Two cars were withdrawn before reaching Pitlochry, the end of the day's

run, these being the 28 horse power Mass, with stripped teeth on the magneto drive, and the 30 horse power Vinot, with a broken inlet valve. Thirty-eight cars obtained non-stop awards for the day.

FRIDAY, JUNE 18.

Another circular route was programmed for this day, from Pitlochry via Grantown and Braemar back to Pitlochry, a distance of 163 miles. There was no timed climb, for which everyone was thankful. The only long, steep hill that had to be tackled was Cairnwell, which proved such a stumbling block to a large number of competitors when ascended last year during a pitiless thunder storm. This year the surface was quite dry, and every car reached the summit comfortably. But the crux of the journey was some 60 miles of by-ways, purposely selected for their narrowness, precipitous descents and corresponding ascents around hidden hairpin corners that did not permit of the drivers obtaining the remotest idea of what was in front. Marvelous to relate, a large percentage of the cars succeeded in getting through without stopping the road wheels. Some of the drivers of the small and moderate powered cars in Classes A, B, C and D would have been better satisfied with a real timed climb where they would have had a chance of resting for a period before their turn arrived. Bottom gear work was in order most of the day, with 20 per cent, ascents of no great length coming so frequently as to give no opportunity for the water to cool off in the radiator, involving fourteen of the cars in penalties for stops to refill with water. Going down was worse than going up, and the wise regulation giving competitors five minutes each morning to adjust the brakes was here proved to be essential.

Running down the last hill at only I



VIEW OF START OF GRUINARD HILL CLIMB.



TEN HORSE POWER HUMBER GOING UP GRUINARD HILL.

mile from the finishing point of the day's journey came the climax, in the form of a surprise brake test. The cars were stopped at the top, the general impression being that some bad accident had occurred to occasion the break in the run. The cars were then sent down one by one at long intervals, and when well out of sight of those at the summit an official suddenly rushed out of his hiding place and waved a red flag vigorously as a signal for an immediate stoppage. Those who pulled up short within a certain number of yards were then permitted to go ahead; others who ran beyond the predetermined spot had to take the official on board and comply with his directions to suddenly apply the pedal and side lever brakes separately and in unison. The four failures in this surprise brake test were heavily penalized, although loss of marks in this respect would not affect any non-stop award. Of the sixty-one cars still left in the contest, thirtyeight were distinguished with a clean

### SATURDAY, JUNE 19.

This was the shortest journey of the week, 134 miles, the distance being purposely cut down to enable competitors and officials to reach the finish early enough on Saturday afternoon to enable those who so wished to catch the southward bound train for London, as no main line railways run any through service from Scotland on Sundays.

The 14 horse power Argyll met defeat when only 13 miles were wanting to complete the 1,007 miles of the trip. While traveling along a well surfaced level road one of the connecting rods broke—desperate hard luck, as the car had come right through without a single stoppage of the wheels, without a single mechanical trouble, with-

out a puncture, and had put up good times on the hills. To add to the annoyance, the car was practically within sight of the factory where it was built. Two other breakdowns necessitating withdrawal were the 14 horse power Gregoire, with a broken inlet valve (this car was in trouble on every day of the week through overheating caused by a stone striking the radiator on the first day), and the 15 horse power S. P. A., with broken differential gear. A timed hill climb up Fintry Hill, not far from Glasgow, was more in the nature of a speed run, as, although the hill is 2,300 yards in length, the average gradient is only 7 per cent.

#### SUMMARY.

Summarizing the results of the trials, the following figures ought to prove interesting:

The starters numbered sixty-five, and of these fifty-eight were timed in at the finish, giving the splendid percentage of 89.2, a record of finishers for any reliability trial ever held in Great Britain. None of the cars in Classes A and B obtained non-stops for the six days, they being penalizel mainly through overheating on the long hills, and consequently requiring frequent filling up with water and dropping passengers on the hills. But in some cases the records were spoiled for trivial incidents that are entirely beyond the control of any manufacturer. For instance, in Class A, the 10 horse power Riley climbed every hill on the route, including Amulree, without dismounting the passengers; running down hill on the first day with throttle closed to save gasoline, the engine did not pick up at once when the clutch was let in at the bottom, and the car had to be stopped for ten seconds while the engine was cranked over. In Class B the 10 horse power Cadillac had a thirty seconds stop on the first day to relieve an air lock in the gasoline pipe, a ten minutes stop on the fifth day to replace a broken commutator spring, and was further penalized for exceeding sixty minutes in tire repairs on the third day. Seven punctures occurred within a very few miles, all from horseshoe nails, and the Cadillac was the only vehicle to exceed the sixty minutes allowance for tire troubles. This is another case where luck comes in, because this machine bears a fine reputation in England for being particularly economical in respect to tires. In Class B, the 12 horse power Riley also tackled every hill without effort, had no mechanical troubles and but one tire stop of four minutes, yet lost the coveted non-stop certificate through



FIFTY HORSE POWER ARIEL APPROACHING CAIRN O' MOUNT ON FIRST DAY.

cing a cracked spark plug on the first that occupied two minutes. So far as ds the stoppages in the bigger classes,

for the expensive vehicles, the rity were due to badly designed radiathat did not contain sufficient water; ty-one cars suffered penalties for this n alone, quite apart from mechaniroubles, which in the main were quite capable of being put right by adent and without actual repair.

e following obtained non-stop awards he six days:

as C-10-12 h. p. Humber, 14-16 h. p. Miesse. ss D-15 h. p. Mass, 20-30 h. p. Cadillac, p. Straker, 16 h. p. Argyll, 15 h. p. Star, Singer.

ss E-20 h. p. Bell, 20 h. p. Vauxhall, 16 Humber, 20 h. p. Lancia, 15 h. p. Rover, 12 Talbot.

is F-18 h, p. De Dion, 20 h, p. Sunbeam. 18 G-30 h. p. Adler, 24 h. p. Albion.

the various timed hill climbs the wing made the fastest times:

s A-The to h. p. Riley on every hill.

is B—The 12 h, p. Riley on every hill.

ss C—The 12 h, p. Humber on three hills,

ss C—The 12 h, p. Humber on three hills, at 12 h, p. Star on the last day.
ss D—The 15 h, p. Star scored fastest on hills, and second best on one hill, the 15 Straker scoring here by two seconds.

b. p. Humber and the 20 h. p. Vauxhall. The 24 b, p. Vauxhall.

as G—The 30 h. p. Adler scored on two and the 38 h. p. Minerva on the other two. ss H—Having but one starter, the 50 h. p. there was nothing to compete against.

final awards of gold medals in each are not likely to be published for er fourteen days, all observers' sheets g to be rechecked and verified.

### ushing a Gear Shifting Rod. By F. E. WATTS.

a certain rather old style car the rod hifting the gears slid through holes d in the gear case. The case was of iron, and since the walls were only



EARING FOR GEAR SHIFTING ROD.

a quarter of an inch thick, and there no bosses where the holes for the g rod were drilled, these holes soon oval, being nearly one-quarter of an arger than the rod on their longest sion. This not only made the gears adly, but allowed a good deal of oil

\*\*ouble was remedied by making two from hard brass rod. The holes ase were filed round, so as to be a over the small diameter of the The bushings were secured by g, as shown in the sketrch. The dotted show the original shape of the small the bushing, which was countersunk ke riveting easier. The holes for the



ON THE ROAD TO TOMINTUI-FOURTH DAY.

rod were originally a little loose, and the parts went together with very little scraping. The fits were found to be good enough so that the leakage of oil was not objectionable.

### New Sliding Valve Engines.

The enormous amount of free advertising which the sliding sleeve type of internal combustion motor has received in England through its adoption by the Daimler Motor Company, of that country, has turned the attention of British inventors to this type of engine, and novel designs are beginning to make their appearance in the patent records. One of these is an engine invented by P. Riley, of Hollybank, Radford road, Coventry. It will be remembered that when the Knight engine was described in a paper read before the Royal A. C. the chief objection urged against it was that there would be a tendency for the sliding sleeves to run hot, and it would, on this account, be difficult to effectively lubricate them. It was evidently this supposed difficulty that Mr. Riley sought to overcome in the design shown by his patent. In order to prevent overheating of the sliding sleeves the latter are not placed between the piston and the water jacketed cylinder, as in the Knight motor, but between concentric water jacketed cylinders. The piston is surrounded by a double walled or jacketed cylinder. the outer wall of which is provided with ring grooves and packing rings, the same as the piston; the outside of this jacketed cylinder is turned down to a smooth finish, and this cylinder is surrounded by the two sliding sleeves, which are similar in every respect to those of the Knight engine. Then comes another water jacketed cylinder which surrounds the sliding sleeves.

The recent tests of the Daimler-Knight engines by the Royal A. C. would seem to indicate that the supposed danger of running the sliding sleeves hot does not exist. The construction above described would add very materially to the weight and bulk of the engine, as well as to the cost of construction.

### Eisenhuth Horseless Vehicle Business to Be Wound Up.

George T. Schull, trustee of the estate of the Eisenhuth Horseless Vehicle Company, of Middletown, Conn., has filed a petition asking for authority to sell at private sale the office furniture and office fixtures of the company, which were not sold at the time the greater portion of the estate of the bankrupt was sold at public auction. The petition will be heard before Gustav B. Carlson, referee in bankruptcy, at his office in Middletown, Conn., on July 10, 1909, at 10 o'clock a. m.

Mr. Schull also proposes to sell all the accounts and choses in action of said estate that still remain uncollected, at public auction, at the former office of the bankrupt in Middletown, Conn., on July 10, 1909, at 2 o'clock in the afternoon.

The delay in the settlement of the estate is said to be due to the pendency of certain actions at law in the Superior Court for Middlesex County. The prospects are that these cases will be determined in October next, or soon thereafter, and as soon as this is done the trustee will proceed to close the matter in bankruptcy.

So far all priority claims, with the exception of one or two minor matters that are in dispute, have been paid. The dividend that will be eventually declared on general claims will not exceed I per cent.

# NEW VEHICLES AND PARTS > >

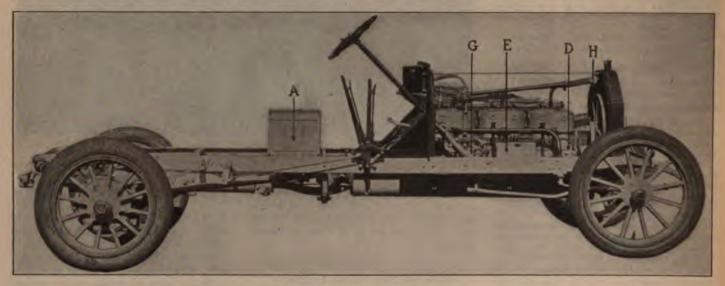


Stevens-Duryea 1910 Models.

Since the Stevens-Duryea Company, of Chicopee Falls, Mass., adopted the power unit, three point support construction in 1904 the cars turned out by it have always been of distinctive design. This construction, whereby the motor crank case, the multiple disc clutch and the sliding pinion change gear are combined in a single unit,

40 horse power, the motor having a bore of 43/4 inches and a stroke of 43/4 inches. Among the chief features of this model are platform spring suspension at the rear, a wheel base of 142 inches and 36x4 inch and 36x5 inch rear wheels. The Model X is a four cylinder, five passenger touring car of 24 horse power, the motor having a bore of 43/4 inches and a stroke of 43/2 inches. This model is practically the same as last year, the changes consisting in a refinement of the body, a slight change in the guard over the rear wheels and the addition of a torsion rod

ing car, fitted with either a runabout body with single bucket seat or with a baby tonneau body. The rear seats of the baby tonneau are easily detached, but are not interchangeable with the single bucket seat of the runabout. The wheel base of the Model XXX is 109 inches, and its frame is supported on semi-elliptic springs, the front ones being 36 inches long and the rear ones 56 inches. This model is equipped with 36x4 inch rear and 36x3½ inch front wheels for the runabout, and 36x4 inch front and rear wheels for the baby tonneau body. It will be noted that only one size



SIDE ELEVATION OF CHASSIS.

A, gasoline tank; D, circulating pump; E, lubricator; G, steering gear housing; H, union joint to radiator.

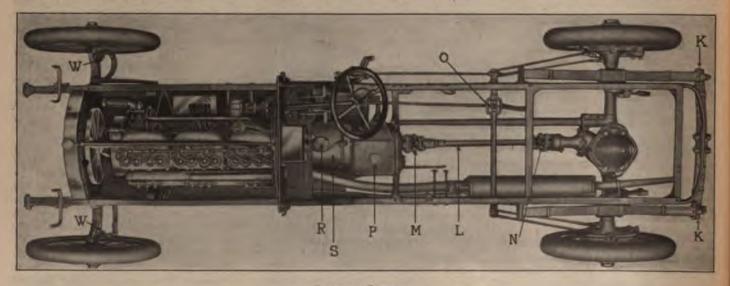
has been retained up to the present, and is embodied in the 1910 models of the company. In 1905 the company began to manufacture six cylinder cars, and its 1910 line also includes one model of this type.

The 1910 line includes three chassis models which may be fitted with different types of bodies. The Model Y is a six cylinder, seven passenger touring car of

to the rear axle. This model also has rear platform springs. Its wheel base is 142 inches, and it is equipped with 34x4 inch wheels both front and rear. Both the Model Y and the Model X may also be fitted with enclosed bodies, and the frame is of such design that touring bodies may be interchanged with limousine or landaulet bodies. Model XXX consists of almost the same chassis as the Model X tour-

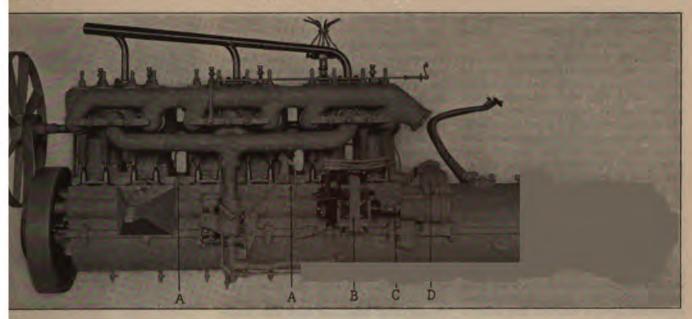
of cylinder is being used for all three models.

It will be seen from the illustrations that the cylinders are cast in pairs and have all valves on one side. Contrary to the usual practice, the cam shaft gears are located at the rear end of the motor and the flywheel at the forward end. The cam shaft gears have a fibre gear crown which insures noiseless operation. These gears



PLAN OF CHASSIS.

K, K, special spring hangers; L, propeller shaft; M, N, propeller shaft universal joints; O, foot brake compensator; P, gear case cover; R, inspection hole cover; S, clutch housing cover; W. W, stops for steering knuckles.



CARBURETOR AND MAGNETO SIDE OF POWER UNIT.

AA, studs for adjusting cam shaft bearings; B, strap holding magneto in place; C, universal coupling for driving magneto; D, cam gear using.

not lubricated. At the left hand side ne crank case there are two studs contact with the upper half of the cam shaft bearings, thus making it ble to adjust these bearings without g the motor apart. The cylinders are nd on special machines, and water is hrough the jackets while the grinding ring place. In this way, it is claimed, rinding wheels may be rotated at their mum speed without danger of overng the metal and thus distorting the ler bore. The manifolds are so ard that the carburetor and inlet manian be removed together without taking xhaust manifold down. The high tenmagneto, which is located on the left side of the motor, is driven direct a gear in the clutch case by means mall universal coupling which obviates rain on the armature shaft. The magis located a considerable distance back e radiator, where it is unusually well ted against water and mud drawn gh the openings of the radiator. It ured to its base by means of a metal and can be removed after loosening inding screw.

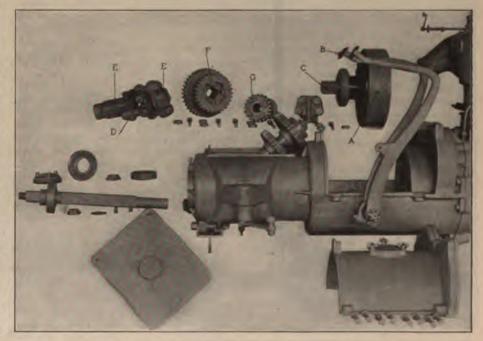
timer, oiler and circulating pump are d on the right hand side of the motor. timer is located at the upper end of tical shaft which is operated from a shaft running parallel with the cam on the opposite side, by means of a gear. The same lay shaft also drives ler and centrifugal pump. The crank is provided with four "breather pipes" gh which the crank chambers may be ly filled with oil. The mechanical forces oil under pressure direct to the crank shaft bearings. This sysf direct lubrication has been found to ost economical of oil, and also to the greatest life of the bearings. The s, connecting rod bearings and other al working parts are lubricated by

splash, the supply of oil in the crank case being constantly replenished by the oil working through the main crank bearings. Into the bottom of the crank case are screwed six standpipes of a certain length, with pet cocks at their lower ends, by means of which any excess of oil in the crank chambers may be drained off.

The crank shaft is forged from special nickel steel, has all bearings ground, and is accurately balanced. The shaft is supported in four large bearings from the upper half of the crank case, which permits of removing the lower half without disturbing the bearing adjustment. A time saving feature of the design is the possibility of

removing any of the pistons without taking the cylinders off. After the lower half of the crank case is removed and the cap on the connecting rod taken off, the connecting rod and piston may be pulled out together. This feature is thought to be a very valuable one, as it is unnecessary to break water connections, remove the cylinders or disturb any of the adjustments when a piston has to be removed. The pistons and connecting rods are carefully equalized in weight so as to insure perfect balance.

The fan is supported from the motor base by means of a forged arm, and rotates on ball bearings. It is driven by



CLUTCH AND TRANSMISSION REMOVED.

A, driving member of clutch; B, clutch pedal; C, driven member of clutch; D, grease cup; E E, squared hubs of universal joint; F, internal teeth of sliding gear to secure direct drive; G, sidewardly projecting teeth on driving pinion to mesh with teeth F.

means of a belt, the tension of which is maintained constant by means of a spring on the supporting arm.

The clutch is of the multiple disc type and operates without lubrication; it is of the same design that has been used since 1904. The driving discs are faced with a friction material composed of woven wire and asbestos, which is claimed to be indestructible, and these discs alternate with driven steel discs, the two sets of discs being pressed together by means of springs. The clutch is disengaged in the usual way by a forward motion of the clutch pedal. The clutch shaft is connected with the change speed gear by means of a square clamp which, unlike universal joints, needs no lubrication.

The change speed gear is of the sliding pinion type, and gives three forward speeds and one reverse. The gears are cut from chrome nickel steel. One of the pinions of the sliding set is cut with four internal teeth, which mesh with four corresponding projections on the end of the driving gear, whereby the direct drive of the third or high speed is obtained. This design of direct drive is said to insure a very compact gear set, to obviate stripping of gears and to insure a positive and quiet change from the second to the high gear without the necessity of first adjusting the motor speed to the car speed. The main driving square shaft and the countershaft of the gear set are carried in annular ball bearings. The entire gear set operates in a bath of oil. To the rear end of the change gear shaft is secured a universal joint by means of a square connection. The rear end of this joint has a long square hole to form a sliding joint with the propeller shaft. This

9 8 9

REAR AXLE DIFFERENTIAL REMOVED.

8, bevel gear; 9, 9 lock collars for adjusting mesh of bevel pinion and gear; 10, 10, clamps for locking adjustment; 11, 12, wing nuts for hand adjustment of brakes; 14, torsion rod.

joint is lubricated by means of a grease cup.

The change gear can be readily inspected or removed by unscrewing three thumbnuts and taking off the cover on the casing, without the removal of the body or the gasoline tank. The inspection cover over the clutch can be taken off by removing the footboards of the front seats.

The rear axle is of the full floating type and embodies a number of exclusive features. One of these is that the driving bevel pinion is forged integral with its shaft. The universal joint near the rear axle is secured to the two shafts it connects by means of squared joints. The housing of the differential is dovetailed with a cover, as shown in the illustration. The differential gears are broached with square holes into which fit the inner square ends of the rear axle shafts. All gears of the rear axle drive are of special chrome nickel steel. The outer ends of the rear axle shafts are also square and have dovetailed flanges pinned to them. Square ioints are used almost exclusively throughout the drive. The advantage of the integral construction of the bevel pinion and its shaft resides not only in the impossibility of the pinion coming loose on its shaft, but also in the fact that if at any time a section needs to be removed, it is sure to be in line and run true upon being replaced.

The differential rotates as a unit on special ball bearings of the cone and cup type, which type is equally efficient under radial and thrust loads. By turning lock collars on the differential case the bevel pinion and its gear may be brought into perfect mesh. Upon removing the two

clamps shown in the illustration of the rear axle it is possible to withdraw the two rear axle shafts and remove the differential gear as a unit.

The rear wheels revolve on the stationary axle housing, and are fitted with annular ball bearings at both ends of the hubs. The pinion shaft is also carried in two annular ball bearings, the two bearings being at a considerable distance apart, so as to relieve all annular strain on the shaft and pinion. The foot brakes, which act on the rear wheel drums, may be readily adjusted by hand by means of wing nuts. One-



STEERING ARM AND WORM WHEEL SECTOR.

half turn is usually sufficient, and the nuts then automatically lock in slots on the upper half of the brake shoe. These brakes are equalized by means of a ball and socket device. The rear axle housing is provided with a tubular torsion rod connecting by a ball and socket spring connection to the cross member of the frame at the rear end of the power unit. The spring seats are free to turn on the rear axle housing, the bearings of the seats being lubricated, whereby all torsional stresses on the springs are obviated.

The sleeves for the spring seat are adjustable lengthwise on the axle housing, so as to make it possible to bring the rear bearing in the gear case in exact alignment with the forward bearing of the rear axle pinion shaft.

The gasoline tank, which is located on the front seat, has a capacity of 22 gallons, and contains an auxiliary supply of 3 gallons. All of the motor accessories are unusually accessibly located. The water leads are connected to the radiator by means of threaded unions, which permit of easily breaking the connections. The steering gear is of the worm and sector type. The worm gear is forged integral with the shaft, and meshes with a worm sector to which the steering arm is connected by a squared, tapered joint. Any wear in the steering gear may be taken up by means of an eccentric bushing. The tie rod of the steering gear is located back of the axle. Incorporated in the construction of the steering knuckle arms are two adjustable stops which prevent the front tires from coming in contact with the frame, and also prevent the possibility of the front wheels becoming locked when turned to the extreme in either direction. The steering rod extending from the bottom of the steering post to the right hand steering knuckle is provided with spring connections to take up any strains. At the upper end of the steering post, above the steering wheel is a stationary quadrant over which the spark lever and throttle lever move.

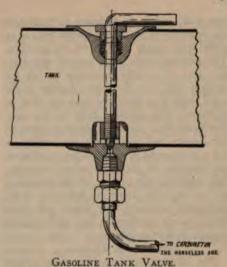
### THE HORSELESS AGE.

are considerably strengthened. The forward end of the rear side springs is connected by offset forgings to the side frames.

### Corbin 1910 Models.

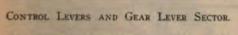
The Corbin Motor Vehicle Corporation, of New Britain, Conn., are preparing to build cars of four different types for the coming season, as follows: Model K touring car, five passengers; Model O roadster, with detachable seats, two, three or four passengers; Model O baby tonneau, four passengers; No. 14, limousine, town car or landaulet, seven passengers.

With the exception of the rake of the steering column, strength of springs and the rear axle gear ratio, the chasses of the different models are similar, except that the wheel base of the No. 14 chassis is 6 inches longer than that of Models K and O. There is little difference between 1909 and 1910 models, most of the changes being in the engine. The latter is supported by the pan in the same manner as formerly, but instead of the deep section aluminum beam, extending across the front of the engine and join-



The Bosch magneto is driven by an aluminum gear on the cam shaft which meshes with an all fibre gear on the magneto shaft.

The rear axle, which is of the semi-floating type, is provided with an axial adjustment for the differential unit, as well as a similar adjustment for the driving pinion.

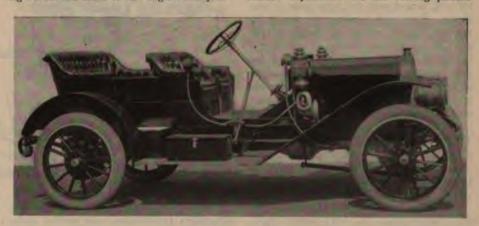


The former is located on top of the quadrant and the latter below.

There is also a foot accelerator on the footboard. A muffler cut-out valve is located

in the exhaust pipe directly in front of the muffler. The gear shifting lever operates in a "self finding" quadrant, permitting of quickly and positively making gear changes. A feature of the emergency brakes, which, like the service brakes, act on the rear hub drums, is that the connection from the hand lever to the brakes is made by rods direct. These brakes are applied by a forward motion of the brake lever,

The steel employed in the springs of this year's Stevens-Duryea cars is said to be of a special grade selected after very exhaustive tests. The rear springs are of the platform type and are provided with connecting shackles specially designed to overcome the side roll on curves of large fast cars. Both the front and the rear spring clips are of special design, which allows of the springs being made without the usual binding holt in the centre, whereby the springs



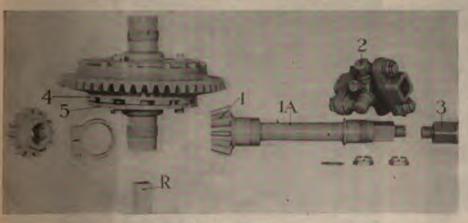
CORBIN 1910 MODEL,

ing the side members of the frame, a lighter section steel beam is used, for the purpose of transmitting the torque reaction of the motor. The timing gears in the new models are enclosed, and the oil pump is now of the vane type and is located at the lower end of the vertical timer shaft, which is driven by helical gears from the cam shaft.

The side members of the frame are t inch deeper at the middle portion than last year. and also deeper at the forward end. This change has improved the looks of the car to a great extent. The flaring pointed fenders, characteristic of the former runabout model, have been discarded in favor of the conventional flat type. The dash is now a separate unit, mounted on a well braced metal frame, as shown. Beneath the slanting footboard there is an oil tank fitted with a cast, oval shaped filling attachment, the opening of which is closed by a hinged cover fitted with a spring. Upon the front of the dash there is a four unit Connecticut coil with a kick switch. The cables enter the coil box from the dash side, instead of from the bottom, as formerly. A rubber gasket is placed between the coil box and the dash. A three lead sight feed oiler is also mounted on the dash, and the bearing through which the steering column passes is split at one side so as to be adjustable for wear by means of a bolt and nut.



As shown by the illustration, this valve, which is of the needle or crush seat type, is combined with the outlet from the gaso-



PARTS OF REAR AXLE DRIVE.

1, bevel pinion; 1A, pinion shaft; 2, rear universal joint; 3, rear end of propeller shaft; 4, differential casing; 3, differential casing cover; R, inner end of one rear axle shaft.

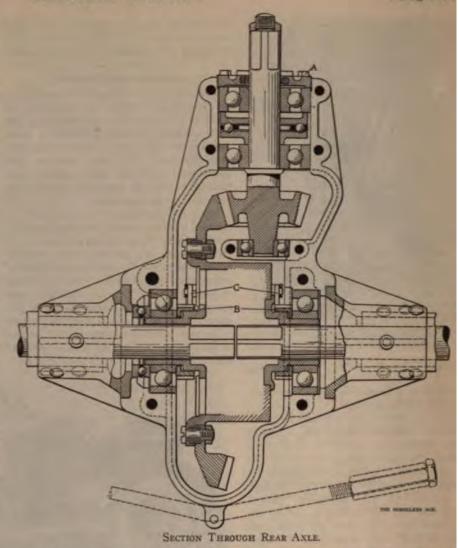
line tank, and is so designed as to obviate the necessity of reaching beneath the car or under the bonnet to shut off the gasoline. The gasoline tank being beneath the driver's seat, it is only necessary to lift the cushion and turn the valve handle to the right until it is seated to stop the flow of gasoline. The gasoline tank on the runabout and baby tonneau models is arranged for gravity feed under ordinary conditions. but a hand pump is provided for creating an air pressure in the tank when necessary, thus necessitating a valve which will admit air to the tank under the influence of atmospheric pressure, and which will close when the air pressure in the tank becomes greater than atmospheric.

### REAR AXLE HOUSING.

The illustration shows the arrangement of the driving pinion, which is integral with the shaft and is supported by three annular bearings and provided with a thrust bearing which may be adjusted by the crown nut A, which is locked by a pawl, not shown. The method of driving the differential housing by means of thimbles which register with it and with the large gear is also shown. This unit is adjustable axially by the cup nuts B, which are locked by the pawls C. A feature worthy of special notice is an opening in the top half of the axle housing, facilitating the introduction of lubricant to the housing. The opening, which is oval in shape, is closed by a cover secured by two wing nuts. The standard rear axle gear ratios are: For touring cars, 31/2 to 1; roadster, 31/4 to 1; baby tonneau, 31/2 to 1, and the seven passenger car, 4 to 1.

### Interlaced Curled Hair Fabric for Automobile Cushions.

The American Sanitary Mattress Company, Philadelphia, Pa., have placed upon



the market an interlaced curled hair fabric for automobile cushions for which several advantages are claimed over stuffed cush-

ions. The interlacing process is claimed make the stuffing one piece, thereby redering it springy. The fabric is made



FRONT VIEW OF MOTOR

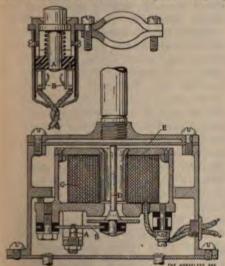


FORWARD PART OF CHASSIS.

one block in any desired thickness, from 1 inch to 8 inches, either loosely or tightly interlaced. The fabric is entirely independent of the covering, and is so made as to insure thorough ventilation. The surface is smooth, no tuftings being used.

### Holtzer-Cabot Electric Horn and Hand Wheel Switch.

The Holtzer-Cabot Electric Company, of Boston, Mass., have placed an electrically operated signal horn on the market which is similar to other electric horns in principle, but different in construction. As in other horns, the sound is produced by causing a diaphragm to vibrate under the action of a clapper or hammer which generally strikes the centre of the diaphragm, usually of metal, hard rubber, celluloid or wood. However, in this instrument the clapper strikes the diaphragm twice each time the armature to which it is attached is attracted by its electro-magnet; that is,



HOLTZER-CABOT ELECTRIC HORN AND HAND WHEEL SWITCH.

once when the armature is drawn toward the magnet and again when it is released.

The construction is shown by the cut. When the circuit, comprising a 6 volt source of direct current, is closed, the current will flow through the contact point A secured to the spring blade B, and thus energize the magnet coil which will attract the armature attached to but insulated from the spring blade. The clapper D is, therefore, caused to strike the sheet bronze diaphragm E and deflect it so that the end of D leaves E, and on the return stroke, prior to again completing the circuit at A, it again strikes E, because of the action of the spring blade B.

The mechanism is enclosed in a polished cast bronze case 3½ inches in diameter and 2¾ inches high. Three holes are provided in the bottom plate for screws to secure it to the car. The wires which conduct current to the magnet coil pass through a hard rubber bushing in the side of the case, and the bell-shaped portion of the horn is attached to the upper plate, as shown.

For closing the circuit to operate the horn, a push button switch attached to a length of flexible conductor is furnished. The switch may be readily clamped to a spoke of the hand wheel or other convenient part which will fit the clamp.

The switch consists of a tubular brass casing about seven-eighths of an inch in diameter and 2 inches long, which has an interior insulating wall of sheet fibre and is secured to the upper part of the switch by two small round headed screws. The push button is made of hard rubber and has a disc of mother-of-pearl inserted in the top surface to decorate it. A square brass plunger A, rounded at the end, is attached to the button, which when depressed against the force of the coiled spring shown causes A to make contact with the stamped bronze pieces B, which are secured to the binding posts to which the conducting cable is connected.

### Rogers' Cleansing and Polishing Preparations.

The Detroit Varnish Company, of Detroit, Mich., are bringing out a line of cleansing and polishing preparations for use on automobiles. These preparations are sold under the name of Rogers' automobile specialties, and include the foling: Carbon solvent, for cleaning the interior of engine cylinders; Auto-brite, for polishing and preserving varnished surfaces; Brass-shine, for polishing metal parts; Auto-top dressing, for redressing tops, lamp hoods and tire covers; Klenzer, for cleaning varnished and painted surfaces. The name Rogers is prefixed to all the above titles. These specialties are distributed by the Automobile Equipment Company, 260 Jefferson avenue, Detroit, Mich.

### Stamped Aluminum Floor Covering.

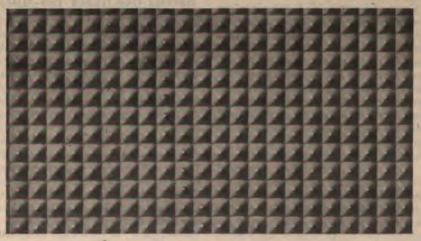
The Factory Sales Corporation, 1438 Michigan avenue, Chicago, have just brought out a new floor covering for automobiles, designed to supersede rubber,

corkaline and the various covers heretofore used. It is stamped from sheet aluminum alloy in pyramid form, and after
stamping is sand blasted to give it all the
appearance of the cast aluminum floors
found in some of the most finely finished
cars. It is designed to lay over the regular
floor boards, securing it in place by the use
of a special binding strip provided for the
purpose.

The metal is claimed to be much harder than the ordinary aluminum, making it very durable. The prime advantage of the covering is its cleanliness, which will appeal to everyone using the car. It is furnished in sheets 36 inches wide by 85 inches in length. Being finished clear to the edges, there is no waste.

### The Union Dry Cell.

The Union Battery Company, of Belleville, N. J., have recently placed on the market a dry cell intended for ignition work which is enclosed in a 21/2 inch square cardboard box 6 inches high. This cell is known as No. 6, and is at present the only size manufactured by the company put up in this manner, but in the near future larger cells will be placed on the market. The top of the box fits the binding posts and prevents the cell from turning, and the square package permits the cells to be conveniently packed in the battery box without the use of filling materials, such as waste, usually found necessary to prevent the cells from rattling. The manufacturers have conducted numerous tests on these cells. They inform us that in one test, where a battery was connected to a coil taking one-quarter of an ampere, it operated the coil for a continuous period of 114 hours, and at the end of this time showed a current on short circuit of 21/2 amperes. One of the claims made for the cell is that because of its high internal resistance it cannot be damaged by an excessive flow of current on short circuit, and it therefore recuperates rapidly after having been worked to the



PYRAMIDE ALUMINUM FLOOR COVERING

### A Ceiling Suspended Drill Press.

Birch & Birch, of Crawfordsville, Ind., have brought out a high speed drill press which may be used for work which cannot be handled by the ordinary floor mounted machine. The tubular column is adjustable to the height of the work, and the machine may be used to drill at the centre of any diameter by removing the table and the lower column to which it is secured. The spindle head is fastened to one end of the upper column, which is clamped into the stationary sleeve of the drive pulley bracket. The lower column is similarly clamped into the spindle head. The table is clamped on the lower column, and all clamping screws are provided with swinging levers to avoid the necessity of a wrench. The drill spindle has lever feed and is driven by a three step pulley, and the machine may be furnished with counterweights to balance the weight of the head and column, and by using longer or shorter connecting tubes from the stationary drive pulley bracket to the ceiling flange the machine may be adapted to any height of ceiling.

### Grout Company Reorganized.

The Grout Automobile Company, of Orange, Mass., which has been in the hands of a receiver for a number of years, has been reorganized with Walter J. Gould as president, Elisha S. Hall treasurer and Geo. E. Dexter secretary. Mr. Gould has been connected with the Grout Company for a number of years as salesman and demonstrator. Mr. Hall is treasurer of the Orange Co-operatve Savings Bank, and Mr. Dexter secretary of the Chase Turbine Company. The new company plans to continue the manufacture of the present Grout models, and to increase the manufacturing facilities so as to be in position to do a good business during the 1910 season. The disposal of the property to the new company will remove the principal obstacle to a settlement of the estate. of the late William L. Grout.

# Dividend for Electric Vehicle Company Creditors.

Judge Cross, of the United States Circuit Court of Trenton, N. J., has signed an order authorizing the receivers for the Electric Vehicle Company to pay all holders of proved unsecured claims a dividend of 20 per cent. The order permits the receivers to accept and pay the same dividend on claims aggregating \$101,094.35, which had been filed out of time, and bars all creditors who have not heretofore presented their claims from participating in the proposed distribution.

The petition pursuant to which the order was made recites that unsecured claims to the amount of \$3,282,557.42, exclusive of interest, have been presented. Of this amount claims aggregating \$2,710,235.49 were allowed in full, to which is to be added the \$101,094.35 allowed by the order just signed, while claims aggregating

\$18,409.33 were allowed for amounts totaling \$11,350.27.

The petition recites that the receivers have \$150,000 cash in hand, and will receive \$430,000 from a reorganization of the committee for the assets of the company, pursuant to an order of court made June 15.

The order signed by Judge Cross extends the time of filing of the receivers' final report sixty days from July 1.

# Convention of Packard Repair Shop Superintendents.

Superintendents of the mechanical departments of Packard agencies throughout the country visited the factory of the Packard Motor Car Company at Detroit during the past two weeks. Meetings were held daily at which the mechanical features of the 1910 models were discussed, as well as the general conduct of repair work and shop service. The visitors also spent much time in the factory and took drives in the new cars. Most of the men are graduates of the Packard factory. Their own experience during the course of the year naturally proved most interesting to the factory experts, and so the conference was mutually beneficial. These meetings will be held annually hereafter.

# Outgrowth of the Transient Garage Business.

A fight is being made at Poughkeepsie, N. Y., against the boy runners of local garages, who are said to "hang around" the best hotels of the city, and as soon as an automobile arrives urge the driver to put it up at the particular garage they represent. The objection to these runners is said to be based upon the fact that when they are not engaged in actual service they appear to be engaged in active deviltry. The garage owners pay them 25 cents for every car that they bring to their premises. It is thought that the only method of putting these runners out of business is to have an ordinance passed which bars their occupation.

# Buffalo One Gallon Ton-Mileage Contest.

Fuel economy contests seem to be gaining in popularity, as the large Buffalo A. C. has just decided to organize an event of this kind. We believe, by the way, that this is the first competitive event ever conducted by this club, which, next to the A. C. A., is the largest organization of its kind in the country. The event planned will be a I gallon mileage contest, and will be in charge of a committee headed by Laurens Enos. There will be five classes, as follows: Class A, for cars selling up to \$1,000; Class B, cars from \$1,001 to \$2000; Class C, cars from \$2,001 to \$3,000; Class D, cars from \$3,001 to \$4,000; Class E, cars above \$4,000. In each class there will be two divisions, one for private owners and one for manufacturers and dealers. At the start of the contest each car will be weighed and furnished with I gallon of gasoline, and the car which produces the greatest number of ton-miles with this amount of fuel will be the winner. There will be one winner in each division, and also a general winner of the contest. The event is scheduled for Wednesday, July 7.

### Garage Lighting and Ventilating.

It is not usual to have the car storage space as brightly lighted as the repair shop or the office, and usually the light admitted by the windows at one end of the space is sufficient for the requirements. However, it is advisable to provide a fitting for attaching a connection for a hand lamp or a portable buffer for polishing the bright work on the car, to the wall at the back of each car, or perhaps each two cars. The repair shop should be lighted preferably by skylights, so arranged as not to admit direct sunlight. The office and showrooms should always be brightly lighted, and they usually have plate glass show windows.

Electric lighting systems of various kinds are at present used in garages, and include incandescent globes arranged singly or in clusters and suspended from the ceiling or from the walls and pillars of the building, or a system using enclosed are lamps. Nernst lamps or mercury vapor lamps suspended overhead. The latter systems are more economical, and for lighting the car storage space they are ideal, provided receptacles are arranged so that plugs attached to portable incandescent lamps may be connected for local lighting when examining or working on the car. The runway leading into a garage should not be brightly illuminated, because the contrast between it and the dimly lighted street may be so great as to momentarily blind a driver. A good arrangement consists of a lamp of not over 100 candle power on either side of the doorway on the outside, and a row of incandescent lamps fitted with reflectors to throw the light toward the ceiling and arranged above the door in the driveway. This arrangement is particularly pleasing and viewing the doorway from the street side gives an impression of much greater brightness than really exists, because the light is evenly distributed and there are no deep shadows and very bright spaces, such as there would be if the light was thrown directly down, instead of being reflected to the ceiling, which should be painted white.

At the recent convention of the German Association of fire department heads in Hamburg, Chief Reichel, of the Berlin department, reported that thirty-one fire departments in Germany have seventy-one motor fire wagons in service at the present time. In the course of the convention the new motor propelled "fire train" of the Hamburg department was inspected by the delegates.

# COMMUNICATIONS



# Stopping When the Brakes Fail. Editor Horseless Age:

I am very much interested in the recent discussion in your columns of the best way to handle a car that stalls ascending a hill. Mr. Moore's plan is clear if the engine is simply stalled, but I doubt if it would work in practice, for while making the shifts the car would gain too much momentum to stop it.

Your suggestion to use the low gear with the clutch in is the only help possible if the brakes are doing nothing, but the assumption is that the brakes would be at least retarding some, and it would be unwise to throw them off and run the chance of catching the low gear. If the low gear was already engaged the plan might work all right. On one occasion, up a steep and winding hill which my car would usually take easily on the second, the engine rather suddenly lost power, on account, probably, of overheating, and having no momentum the car stopped and commenced to back before I could engage the low gear. I could, perhaps, have kept at it and caught the low, but thought it better to use the brakes, which have always held, and stop the car before shifting gears. This time the brakes did not hold strongly enough to stop her, and as the speed appeared to slightly increase I played for safety and backed into the bank. Result: almost an upset, but no damage. In all probability I could have caught the low and gone on, or could possibly have stopped by the brakes, or at least steadied enough to back down, but it is a difficult job to steer backward down a steep hill. A failure of either of these plans would have put me in great peril, and I still think I did the wisest thing, as safety is the first consideration.

I would like to ask, Is it possible to engage the low speed ahead when the car has started to move backward, even slowly? The weight of the car through the friction of the rear wheels is turning the shaft and the gears in the reverse direction, and would not this make it impossible to change? Are sprags (once widely advertised) of real, practical value? J.

[Answering your first question, not all cars are fitted with sliding change speed gears, and with almost all other types of change gears it is possible to engage the low gear, no matter what the speed of the car may be, although this may subject parts of the mechanism to great strain. We believe it quite possible to enmesh the gears of the first forward speed of a sliding gear if the car is running backward only slowly. Much, of course, depends upon the amount of chamfering given the tooth ends. If a car has once attained a high speed backward down hill there is little possibility of getting it under control again, and every

effort should be made to prevent it from acquiring this backward speed. If one is not sure of being able to engage the low gear and safely steering down the hill backward at a moderate speed, if there is a bank at one side of the road of sufficient height to promise to hold the car, it is certainly the best plan to steer into the bank. No attempt should be made to turn the car through a quarter circle and run with the two rear wheels squarely against the bank, as there is then considerable danger of overturning the car, but the car should be run against the curb at an angle depending upon the steepness of the grade, the height of the bank and the speed already acquired.

Sprags are efficient safety devices when properly used. They are of no use when let down after the car has already acquired considerable backward speed. If you are not sure of your brakes you should let the sprag down upon starting up a particularly steep hill, or if your engine dies down on the low gear you should let the sprag down before the car comes to a stop.—ED.]

### Oueries.

Editor Horseless Age:

Which would, under the same conditions, wear the longer time, a spur or a bevel gear? How much longer? Which takes the more power? How much more? Which makes the more noise? How much more?

[A spur gear is generally more efficient than a bevel gear, for the reason that the bevel gear cannot be, or at least generally is not, as accurately cut as a spur gear. The bevel gear would, therefore, take more power and have a greater tendency to be noisy, but no actual figures can be given for the differences, as they depend upon the pitch line or tooth velocity, pressure on teeth, size of teeth, material, accuracy of the teeth and other factors. With equal pitch line velocities and equal tooth pressures spur and bevel gears should last about the same length of time.—Ep.]

### Opposed Engine Crank Connection. Editor Horseless Age:

As a subscriber to your paper, I take the liberty to ask the following questions: Kindly explain the method used in a recent four cylinder opposed motor to get the pitman rods working in a straight line. How does this construction compare in efficiency with the usual connecting rod? What are the disadvantages, if any? Do the advantages more than offset the disadvantages? Is it patented?

Brewster Godlove.

[The usual connecting rod is replaced by two eccentrics, one over the other. The two eccentrics have the same throw, and as the centre of the inner one travels away from the centre line of the pistons, the centre of the outer one travels in the opposite direction relative to the inner one and always remains in the centre line of the piston. We do not believe that this arrangement is as efficient mechanically as the regular connecting rod arrangement. Its advantage lies in the fact that it makes a very compact motor. Whether the advantages outweigh the disadvantages is a matter of opinion, for there is no means of direct comparison between mechanical efficiency and compactness. We cannot say whether the construction is patented. You would have to make a search of the patent records.—Ep.]

### Hill Climbing Power Not Proportional to Horse Power.

Editor Horseless Age:

C. DEP. F.

[That the 12 horse power car climbs hills as well as the 18 horse power car may be due to one or more of the following three reasons: The 12 horse power car may be lighter than the 18 horse power car; the 12 horse power car may have more gear changes than the 18 horse power car, permitting you to run on a suitable gear a greater part of the time; the 12 horse power car may be more conservatively rated than the 18 horse power.—Ep.]

### French Motor Plowing Contest.

The committee on agricultural machinery recently appointed by the Automobile Club of France has decided to organize a motor plowing competition in connection with the motor agricultural show at Amiens, July 22 and 23, to which will be attached cash prizes to the amount of 2,000 francs. In making the awards the jury will take into account: (1) The execution of the work; (2) cost of plowing per hectare; (3) time necessary for the transportation, installation and putting into operation; (4) number of men necessary for operating the machine; (5) facility of application under different topographical conditions; (6) possibility of using the motor of the machine for other agricultural purposes. In order to create a basis of comparison between the different motor plows taking part in the competition, all calculations will be based on a depth of 18 centimetres, which will be the minimum depth to which the soil must be turned. All types of mechanically propelled plows of both French and foreign manufacture are eligible for entry in this contest. The entry fee is 50 francs per plow, but one-half of this sum will be returned to the entrants who actually present their plows. The entries closed on June 30.

The city council of Budapest, Hungary, has made an appropriation for the purchase of two automobiles for the service of the police department. It is intended to purchase additional vehicles shortly.

# Commercial Applications.



### The Automobile in Paper Making. By J. E. J.

A letter from Ottawa, Canada, states that the E. B. Eddy Company, which is perhaps the largest wood pulp and paper making concern in the Dominion, now almost entirely uses motor vehicles in the yards, hauling paper, pulp, wood, etc. The displacement of horses by motor trucks is a novelty among paper manufacturers in Canada. The company says that a great saving has been effected, each motor doing the work that was formerly done by two and a half to three teams.

The motor vehicle is used for delivering goods to all local customers, and also for loading and unloading cars near the mill. Superintendent George H. Millen states that formerly it took three men and a team of horses a quarter of a day to deliver a load to the newspaper offices; now the motor truck delivers a load of three tons in half an hour. One truck has been in use four years. It is of Springfield make, and has a capacity of three tons. Another with a capacity of five tons, and a trailer attached, carrying as much more, made in New York, was purchased a year ago. With these vehicles the company does all its local carrying nine months in the year. The snow is too deep in the other three months.

The largest truck of the Eddy Company, which weighs thirty tons, is capable of hauling thirty tons more of freight on a railway track, and is often used for shunting instead of a steam engine. One man accompanies the motor truck in addition to the driver, and these two are able to do the loading and unloading. Though the company has to use horses while the snow is on the ground, they are bought in a dull market and sold when prices rule higher in the spring. Anyway it pays to keep the motor vehicles.

### Reliability of Motor Propelled Fire Wagons.

Captain J. C. Barrett of Engine Company No. 6, of Minneapolis, Minn., at the recent meeting of State firemen in Cloquet read a paper on motor fire apparatus, from which the following extracts illustrative of the dependability of such apparatus are taken:

In the city of Vancouver, during the last year's service, the machines of the central station, an auto hose combination chemical, an auto chemical double 60 gallon and a hose wagon with a carrying capacity of 1,500 feet of 2½ inch hose, answered 382 alarms of fire and covered a distance of 750 miles without any failures to respond to alarms. The cost of maintenance was 60 per cent. less than that of the former horse drawn equipment. When responding to alarms the driver of an auto has

much better control over his machine than the driver of horse drawn apparatus.

The city of Springfield, Mass., has in service two auxiliary squad wagons, and 386 alarms were answered. The autos never failed to start but once, and that failure was due to some malicious person having crossed the terminal wires of the batteries. The machine was delayed three minutes.

The automobile of Chief Canterbury of the Minneapolis fire department was put to a severe test when placed in service July 15, 1908. In ten months' service it answered over 380 alarms, and at no time did it fail to respond to an alarm. Last winter conditions were very unfavorable. Steam railroads and street car lines were unable to operate successfully, owing to heavy snowstorms. At no time did the auto fail to do its work more successfully than the horse. The auto has been demonstrated so satisfactorily to the city officials of Minneapolis that they have purchased a police patrol auto wagon.

The annual fire loss is more than enough to provide the most efficient auto apparatus in every city, village and town in the United States today. Hundreds of fires could have been put out with only a nominal loss if they could have been reached five minutes, and sometimes one minute, sooner. The auto apparatus, manifestly, should not be confined to chemical wagons or auto squads carrying small chemicals.

With the horse drawn apparatus you have drivers who are superfluous men. Drivers have to remain with their horses and take care of them, while with the auto every man is available for fighting purposes. But it is in the smaller cities and towns that cannot afford the cost of a steamer that great additional protection will be givencities ranging from 10,000 down to 500 people. As to economy, suppose a combination chemical and hose wagon, two horses, harness and complete equipment cost \$3,000, which is a moderate estimate; it will probably cost 10 per cent. of this amount to feed and care for the horses for one year, to say nothing of shoeing and repairs. The depreciation in the horse would amount to quite a sum also; while, on the other hand, all you would need would be a barrel of gasoline and a half barrel of engine oil. Twenty miles an hour is ample speed for fire department service. as it is three or four times as fast as the horse will go for any considerable distance, and that is as high a speed as would be maintained in practice in city fire depart-

# Indianapolis Grocers Adopt Motor Delivery.

Within the last year Indianapolis grocers, both wholesale and retail, have found it profitable to do their city delivery work with automobile trucks and delivery wagons. The Court House Grocery Company, probably the largest retail grocery concern in that city, has begun an experi-

ment with automobile delivery, and expects to discard all of its horse drawn equipment if the experiment warrants. Schnull & Co., August M. Kuhn & Co. and W. T. Bacon & Co., wholesale grocery concerns, are now doing their city delivery work with automobiles. J. T. Powers & Sons, the Columbia Grocery Company and N. A. Moore & Co. are other large retail grocery concerns using automobiles in their business.

# Milwaukee Commission Merchants Adopt Motor Trucks.

The motor truck is invading a new field in Milwaukee, Wis., several of the big commission houses on Broadway, known as "Commission Row," and extending about six blocks from the centre of the city to Milwaukee River, having purchased cars of this type for quick delivery and transportation services. Perishable goods, fruits and vegetables constitute the bulk of the business, and it is figured that 25 per cent. of the loss incurred in delivery to distant stores and branches in the city can be saved by employing the motor trucks. E. R. Godfrey & Co., 257-259 Broadway, general commission merchants, placed a truck in service about a year ago and another has now been ordered. Meanwhile several other houses are following the example.

### New Buffalo Taxicab Company.

The Buffalo Taxicab Company have leased the Coliseum Building at 32 Edward street. Besides a large taxicab service the company will rent touring cars. They also expect to conduct a public garage. The new company have taken over the property of the E. R. Thomas Taxicab and Transfer Company, which gives them an equipment of sixteen Thomas cars, ten Ewing taxicabs and five Stearns cars. W. A. Morgan, of Buffalo, is president, S. S. Olds manager and W. B. Ford secretary and treasurer. E. R. Thomas, the well known automobile manufacturer, holds considerable stock in the concern, we learn.

# Autos Cheaper Than Horses in Municipal Service.

Chief Clancy, of the Milwaukee (Wis.) fire department, will recommend to the common council that a runabout, at least, be purchased for every assistant fire chief in Milwaukee. He has been using a touring car for two years, while assistant chiefs, who are distributed over a wide territory, are using horses, two being allotted to each, one for reserve. Last week, however, the chief purchased a number of horses, but was disappointed to find that none could be purchased for less than \$285.

"At this rate, runabouts could be purchased for each assistant chief, and at the end of the year the city would be money ahead," said Mr. Clancy. "Feed is unusually high, and our last consignment of oats cost 60 cents a bushel. Our horses are fed nine quarts a day on the average, but the chiefs' horses need ten to eleven quarts, as they are subjected to harder usage. Each has

two. The difference in the cost of maintenance alone would pay for a runabout in one year's time."

The state of finances of the city of Milwaukee, Wis., forced the common council last week to stop at one purchase of a touring car, while two were demanded, one by the board of public works and another by the council itself. The car will be used jointly by the commissioners of public works and the committees of the council. City Clerk Edwin Hinkel will be "official keeper" and issue requisitions for the use of the car. The machine is a Peerless, and the appropriation amounts to \$4,000.

### Spokane (Wash.) Taxicab Service.

The Spokane Taxicab Company has been organized in Spokane with \$50,000 capital stock by C. E. McBroom, cashier of the Exchange National Bank: Robert H. Cosgrove, secretary of the Spokane Interstate Fair Association, and J. D. Williams, an experienced taxicab man, who is general manager of the corporation. Mr. Williams announces that an order has been placed for ten cabs of the four cylinder type manufactured by the De Dion-Bouton Company. They will be delivered early in August, when a contract will be awarded for ten more. The cost of the first ten is placed at \$27,000, exclusive of freight charges.

During the Interstate Fair in Spokane September 20 to 25 the company intends to maintain a station at the fair grounds, and will run cabs to and from the city every three minutes. The following schedule of rates has been made: For from one to three passengers, 30 cents for the first quarter mile and 10 cents for every quarter mile thereafter. A charge of 10 cents for each minute's wait while the car is chartered. These charges are the same for from three to six passengers, except that 10 cents is charged for one-sixth of a mile after the first quarter.

### Commercial Notes.

Patterson & Holloway, a new agency at Monroe, Wis., have established a livery service, four touring cars comprising the initial equipment.

Alex. Marks has established an automobile service between Pueblo and Rye, Col. He will make three round trips a week—on Tuesdays, Thursdays and Saturdays.

A Mr. Allen, of Colorado City, is planning to establish a motor bus service between Craig and Steamboat Springs, Col., a distance of 50 miles, with two large touring cars.

A motor bus line is to be established between Albany and Schenectady, N. Y., by the Eastern Auto Tourist Company. The first line to be opened will start at State and Eagle streets, Albany, and end at State street, Schenectady. Other lines are in contemplation.

An automobile service is to be established between Ironton and Proctorville, Ohio. as soon as a certain stretch of road at Coalgrove has been repaired by the authorities. S. G. Griffith, of Huntington, Ind., will put on a fourteen passenger bus, which will make two round trips a day.

# Franklin Branch Managers' Meeting.

The traveling salesmen and branch managers of the H. H. Franklin Manufacturing Company recently completed their summer conference at the company's factory in Syracuse, where daily sessions were held for a week. During this period the attendants were instructed in the changes made in Franklin models for 1910. The conference was conducted by Sales Manager F. R. Bump, and the salesmen were addressed by Vice President Giles H. Stillwell, Chief Engineer John Wilkinson, Assistant Engineer Arthur Holmes, Sundry Department Manager J. G. Barker, Comptroller H. B. Webb, Superintendent F. J. Haynes, Traffic Manager Herbert Hess and Engineer W. F. Kneip. Several trips in the new models of the company were made by those in attendance.

### Registrations in California.

According to the report of the Secretary of State of California, 938 motor vehicles were registered in the State during May. In May, 1907, there were 613 registrations; in May, 1908, there were 637. In May, 1909, there were recorded 135 transfers or registrations of machines under the names of new owners. This is the record number of transfers in one month in California. Licenses were issued to 180 chauffeurs. In the first five months of 1909 there were 3,632 registrations, 501 transfers and 974 chauffeurs' licenses. It is probable that the total number of registrations for the year will reach 7,500.

### Test for Acid in Oil.

The following test, which can be made by anyone with simple apparatus, is recommended for detecting acidity of lubricating oil: Procure from the druggist a solution of sodium carbonate in an equal weight of water. Take a small quantity of the oil and an equal amount of the sodium solution. Place them in a bottle, shake, then allow to stand. If there is any acid present it will settle to the bottom as a precipitate, the amount of precipitation indicating the amount of acid present.

### Business Opportunity.

We have an inquiry from a large New England company for the names of manufacturers of gasoline engines who build or are willing to build an engine of about 45 horse power with four opposed horizontal cylinders. The engine is to run at constant speed, preferably 500 r. p. m. The company expect to buy one or more such engines. We shall be glad to forward the addresses of any of our readers who may be in a position to satisfy the wants of our inquirer.

### Rugs for Automobiles.

By J. E. J.

The development of the automobile industry has been of great advantage to other trades and industries, as has been pointed out in The Horseless Age. It has, for instance, been of material benefit to the rubber industry, the manufacture of linoleum, to the upholstery and upholstery hardware trades, metals, oils, etc. A list of the trades benefited would fill a column.

Attention was drawn in THE HORSELESS Age last autumn to the increased use of linoleum as a floor covering for the automobile. Luxury will, however, have none of this material, serviceable as it may be. The high class rug now has the call from the lover of the luxurious. From the beginning the rug and carpet salesmen have observed the effect of the motor vehicle industry on their business, until now special designs and grades of rugs and carpets are made, ousting from the favor of the wealthy the linoleum, straw matting and kindred coverings that have hitherto been used. It was but natural that these serviceable goods should be superseded by the more pleasing, soft and attractive pile rugs,

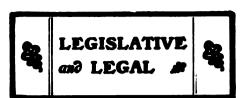
The rugs made to order for motor vehicles are expensive and of superior workmanship, the dyes being of a high grade and not of the aniline order, which are fugitive. The buyer who purchases a rug of pile effect gets a delightfully attractive and comfortable article. The patrons who buy these goods are accustomed to expending large sums on their cars. Some of the enterprising motor rug salesmen have had fitted up for their convenience ingenious representations of the body of an automobile, full size. Sometimes a diagram of a car is made, by means of which the prospective purchaser of a rug can get an idea of sizes and appearance.

Some patrons of the rug merchant require rugs in which is woven a symbol indicative of motoring, or a rug with an inscription. The rugs come in a short nap, or with a long, flowing, worsted-like effect, or with a pile effect.

The chief trouble with these impedimenta—some misname them accessories—is that they gather dirt and mud in greater degree than do linoleum or rubber mats.

The hassock is likewise largely pushed by two houses that devote themselves to the manufacture of this kind of foot rest. These concerns are situated in New York and Chicago, and they claim that their output is of much comfort to riders. The remnants of carpeting are used in the making of these articles.

Fernand Charron has resigned as managing director of the firm of Charron, Ltd., and has been succeeded by Georges Koenigswerther. Charron, it is understood, will enter the Bayard-Clement firm in Levallois, he being a son-in-law of M. Clement. Mr. Charron still retains his financial interest in the firm bearing his name.



### New York City Taxicab Ordinance.

In our issue of June 2 we printed the New York city taxicab ordinance as it was passed by the board of aldermen on June 15. This ordinance was vetoed by the mayor because it did not include a suitable profision for regulating the fares to be charged. It was therefore modified in accordance with the mayor's wishes, and approved by him on June 29. With the exception of the following sections the ordinance as originally adopted by the board of aldermen remains unchanged:

Each vehicle upon which a taximeter is affixed shall be licensed and the owner thereof shall pay annually such fees as are hereinafter provided:

Each special taxicab, \$10. Each public taxicab, \$10.

Each driver of a taxicab shall pay an annual license fee of \$2. The owner or driver of any hack upon which a taximeter is affixed, and who has duly procured a license to use or drive such vehicle according to the provisions of any ordinance hereinbefore enacted, may continue to use or drive said vehicle under such license until its expiration.

The legal maximum rate provided in this ordinance, and any schedule of rates promulgated by the owner of any such vehicle charging less than the legal maximum rate, shall be displayed in a conspicuous place on the inside of such vehicle.

### LEGAL MAXIMUM RATES.

For each taxicab intended to seat two persons inside and driven by motive power, for one-half mile or any part thereof, 30 cents.

For each additional quarter mile or any part thereof, 10 cents.

For waiting time at the rate of \$1 per hour.

For each taxicab intended to seat four persons inside and driven by motive power, for one-half mile or any part thereof, 40 cents.

For each additional quarter mile or part thereof, 10 cents.

For waiting time at the rate of \$1.50 per hour.

For one piece of baggage, 20 cents.

No charge shall be made for handbags, dress suit cases or child under five years of age by any taxicab.

All rates of fare shall depend on the number of persons which each vehicle is intended to seat inside and not on the number of passengers actually carried, and no owner or driver of any taxicab shall use or permit to be used on such vehicle any taximeter which shall calculate or indicate a rate of fare which shall depend on the number of persons actually carried, under a penalty of \$25 for each offense.

# To Stop Abuse of Manufacturers' License Tags.

State Commissioner of Motor Vehicles J. B. R. Smith, of New Jersey, has decided to adopt drastic measures to prevent the increasing abuse of manufacturers' licenses. In a circular sent by Mr. Smith to all holders of such licenses he draws attention to three violations of the law, viz., first, the practice of using only one official identification tag on a car where the law expressly requires two to be carried at all times; second, the practice of loaning license tags, and, third, the use of unofficial markers. Mr. Smith states in the circular that he has instructed his deputies that on and after July I every car found carrying only one official identification marker and every car without a registration certificate shall be immediately taken off the streets, and that upon notification to the department the registration certificate will be summarily revoked; and that on and after July 4 every car carrying a loaned marker will be regarded as driven under a false registration, and the driver thereof will be held for grand jury action.

### Indianapolis Police Chief Indicted.

After a very thorough investigation, in which a score of witnesses were examined, the grand jury has indicted Chief Robert Metzger, Captain Adolph Asch and Sergeant Charles Barmführer for assault and battery. The indictments are the outgrowth of the shooting of Samuel W. Dowden, an attorney, by the police. On June 8, while riding in an automobile with W. Richardson Sinclair, Mr. Dowden was shot in the leg. The three police officers were in an automobile pursuing Mr. Sinclair's car, asserting that it was violating the speed law and that the driver refused to stop when signálled. The case created much indignation, the Indianapolis newspapers uniting in demanding that the chief of police be removed for sanctioning the shooting. After considering the matter, Mayor Bookwalter said that while he realized the shooting had been indefensible and unjustified, he did not believe he would be justified in discharging the chief, because of the large number of speed violations that had occurred.

# Rhode Island's New Garage Law in Force.

The new garage law of Rhode Island, which requires every garage owner to keep an accurate record of every car arriving at and leaving his garage, went into effect the last week in June. The measure was framed to protect automobile owners against unauthorized use of their cars, but it will also afford a means of tracing stolen cars. The forms on which the records are to be kept have been prescribed by the State Board of Public Roads. They contain spaces for the registration number of each car, the name of the operator and the exact times the car enters and leaves the

garage. Violations of the law are subject to a fine of not more than \$100 or imprisonment for not more than thirty days, or both.

### Connecticut Bill Passed by Senate.

The Connecticut Senate on June 29 added an amendment to the pending automobile bill, according to which automobile manufacturers in the State must pay a tax of \$1 each for all test cars driven on the State roads, and another amendment providing an annual tax of \$10 for liverymen who use automobiles in their business. The Senate then passed the bill and returned it to the House.

# New York Municipal Autos to Be Sign-Marked.

The ordinance introduced by Alderman B. W. B. Brown in the New York City Council to mark municipal autos so plainly as to prevent official joy riding, which was defeated two weeks ago, was adopted on Tuesday, 40 to 3, by the Board of Aldermen. A penalty of \$50 is provided for using a city auto without the distinguishing mark.

### Legal Notes.

The Supreme Court of Ohio on June 23 decided that the State automobile license law prevents cities from exacting a license fee from motorists. The city of Cincinnati formerly charged a fee of \$5 annually, and a similar fee was charged in Columbus, Ohio.

Judge Whallon, of the Indianapolis Police Court, has decided that physicians answering emergency calls in automobiles are not amenable to the law regulating speed. In two instances during the last week he has discharged physicians arrested for breaking the speed laws. There has been agitation for some time in favor of such a ruling.

The motorists of Paducah, Ky., have sent a petition to the city council asking for an increase in the speed limits effective within the city. The present ordinance limits the speed to 10 miles per hour on Broadway between First and Seventh streets, and to 6 miles per hour in turning corners, and the motorists request that the limit on Broadway be increased to 15 miles per hour.

The officials of the New Jersey Automobile and Motor Club, with headquarters in Newark, have asked the automobilists of Trenton to assist them in restraining Justice of the Peace Abram D'A. Naar, father of ex-Justice Manfred Naar, who was removed from office because of the complaints of the A. C. A., which proved that he issued summonses by mail, and also collected fines in the same manner. The Newark Club alleges that Abram D'A. Naar is pursuing the tactics of his son, and that a speed trap is in operation between Hightstown and Trenton.

Mayor Wheeler of Utica, N. Y., on June 25 sent a letter to Commissioner of Public Safety Church ordering that official and the police department to enforce the automobile speed law. The mayor says that he has received many complaints of reckless speeding.

The commissioners of parks of San Francisco on June 23 passed new rules regarding the operation of automobiles in these parks. All drives in the parks will hereafter be open to motors, except the avenue in the Panhandle and the road encircling the Stadium

In compliance with the Iowa law, which requires dealers to secure new licenses on July 1 of each year, sixty-five dealers filed application with Secretary of State Hayward in Des Moines on June 28. Last year 290 dealers' permits were issued in the State, and it is thought that the number this year will reach 300.

According to a recent decision of the Appellate Court in Chicago it is as much the duty of the driver of a motor truck to look behind him when he starts to back as it is to look forward when he starts his car forward. The court affirmed a judgment of \$10,000 given in the Superior Court in favor of Clinton Pierson against Lyon & Healy. The plaintiff was the conductor of a street car into which a motor truck owned by the defendant was backed. Pierson received a compound fracture of the left leg.

The city council of Knoxville, Tenn., has passed an ordinance regulating the operaion of horse and motor cabs. Motor cabs cannot be operated by persons under eighteen years of ago. The fare between any two points in the city of Knoxville will not exceed 50 cents. If the cab is detained by the passenger for any reason the charge for such detention shall not be more than at the rate of \$1 per hour. Violations of the ordinance are misdemeanors, and are subject to a fine of not less than \$5 and not more than \$50.

### The Plainfield (N. J.) Hill Climb.

A hill climb on Johnston's Drive, Plainfield, N. J., was the feature of the second day's program of the Charter Day celebration in that city on July 6. A considerable number of cars participated and large crowds lined the course. The upsetting of one of the automobiles almost resulted in a tatality. George Weldon and William Bolen, both of Rahway, in a National car, were just making the last hairpin turn within a few yards of the finish when the car leaped off the road and struck a wooden culvert, turned turtle, and went over an embankment. Weldon and Bolen were thrown out, the former receiving a badly lacerated scalp wound and a deep cut in the face, while Bolen's shoulder was fractured. They were both taken to Muhlenberg Hospital. The course was sevententlis of a mile, with nine difficult turns and an average grade of 15 per cent. The summaries:

First Event-For cars selling for not over \$850:

Won by Maxwell, 22 h. p., driver William Sichinger; second, Maxwell, 22 h. p., driver A. See; third, Hupmobile, 16 h. p., driver R. D. Martin. Time. 1:281/4.

Second Event-For cars selling for not less than \$851, nor more than \$1,250; Won by Buick, 34 h. p., drivers Warren and Easter; second, Overland, 30 h. p., driver George Reese. Time, 1:44.

Third Event-For cars selling for not less than \$1,250, nor more than \$2,000: Won by Marion, 35 h. p., driver Charles Stutts; second, Herreshoff, 24 h. p., driver George Robertson; third, Buick, 24

h. p., driver C. S. Dutcher. Time, 1:36 4-5.
Fourth Event—For cars selling for not less than \$2,000, nor more than \$3,000: Won by Chalmers-Detroit, 40 h. p., driver George Rankin; second, Palmer-Singer, 60 h. p., driver F. C. Lescault; third, National, 35 h. p., driver George Weldon. Time, 1:29 2-5.

Free for All-Won by Stearns, 40 h. p., driver John H. Rutherford; second, Chalmers-Detroit, 40 h. p., driver George Rankin; third, Simplex, 50 h. p., driver William Heitmeyer. Time, 1:28.

Winners' Class-Won by Chalmers-Detroit, 40 h. p., driver George Rankin; second, Maxwell, 22 h. p., driver William Sichinger. Time, 1:28.

### Columbia Motor Car Company Now in Possession of E. V. Company Business.

The reorganization of the Electric Vehicle Company, of Hartford, Conn., has been completed. The new concern, the Columbia Motor Car Company, elected its officers on June 30, and the business of the old company was transferred to it on the same date. The following officers were elected: Herbert Lloyd, of Philadelphia, president, Henry W. Nuckols, vice president, treasurer and general manager; Herbert Lloyd, of Philadelphia; Henry W. Nuckols, Walter G. Henderson, of Philadelphia; William Hooker Atwood, of New Haven, and Kenneth B. Schley, of New Vork directors

The new officers directly after their election took over the assets of the old company, with the exception of the cash in bank, which is to be used in paying dividends to creditors. The Morton Trust Company, of New York, trustee for the bondholders, has released the \$2,500,000 mortgage on the plant at Hartford, and the bondholders will share with the unsecured creditors in a pro rata distribution of the proceeds of the sale of the property. A dividend of 20 per cent. is now being paid. The receivers have not yet been discharged by the court, but will continue in their positions until all the proceeds have been distributed among creditors.

According to reports circulated in Wall Street, the basis of the reorganization so far as the stockholders were concerned was as follows: Holders of the common stock paid \$1 and twenty shares of the old stock for one share of the new stock. Holders of preferred stock also exchanged twenty shares of the old company for one share of the new company, but did not pay a bonus. The new company is capitalized at \$2,000,000 preferred stock, compared with \$9,000,000 preferred in the old company, and \$1,000,000 common stock, against \$11,000,-000 in the old company. The holders of the company's \$1,521,000 bonds are to be given

\$620 in new preferred stock for every \$1,000 bond

### Increase in the Production and Price of Crude Rubber.

The entries at the port of Para for the crop year which ended July 1 of rubber of all grades, including Caucho, have exceeded all previous records for similar periods. The figures for the year are available only to June 28, and it is probable that the remaining days of the month will show that sufficient rubber was brought into Para to bring the total beyond the record figure of 1906-7. The statistics for several years past have been: 1901-2, 30,000 tons; 1902-3, 28,850 tons; 1903-4, 36,580 tons; 1904-5, 33,060 tons; 1905-6, 34,390 tons; 1906-7. 38,005 tons; 1907-8, 36,650 tons; 1908-9, up to and including June 28, 37,970 tons.

The steady increase of consumption in rubber for some months past has stimulated shipments from the plantations into Para to such an extent as to leave smaller stocks than usual at the plantations for future shipments, and the rubber consuming trade will, therefore, be obliged to depend wholly upon the stocks already shipped from the Amazon, while awaiting the next crop, the first shipments of which will not reach Para before the end of the summer.

The price of rubber has advanced considerably within the past year, as may be seen from the following New York quotations for Para grades of one year ago, one month ago and for June 29:

month ago and for	june 29	9:	
Para	RUBBER		
	July 1,	June 1,	June 29,
Para.	1908.	1 909.	1909.
Islands, fine, new	. 88	132	141
Islands, fine, old		133	144
Upriver, fine, new	. 94	135	148
Upriver, fine, old	. 96	136	150
Islands, coarse, new	. 45	67	69
Islands, coarse, old		71	72
Upriver, coarse, new	. 65	99	105
Cameta		78	8 <b>1</b>
Caucho (Peruvian), ball	l. 51	. 88	95
Caucho (Peruvian), shee	t 63	77	81
Ceylon (plantation), fine	. ·	• •	
sheet	•	136	156

### New Late Ferry at Rye, N. Y.

Pursuant to a demand made by automobilists for a late trip of the ferryboat Englewood, running between Rye and Sea Cliff, across Long Island Sound, the management of the line have decided to make one extra trip at night, leaving Rye, N. Y., at 8 p. m. and Sea Cliff at 9 p. m.

The Jacobson-Brandow Company, of Pittsfield, Mass., has secured the contract for 3,000 four cylinder coils for the 1910 output of the Hudson Motor Car Company. of Detroit. The contract is said to amount to about \$45,000.

A deed transferring the property of the Eisenhuth Horseless Vehicle Company, of Middletown, Conn., to the Noiseless Typewriter Company was filed on June 30 by Attorney Culver.

### A Device Designed to Prevent Sooting.

By J. S. V. BICKFORD.

I had a conversation with the tester of a large factory the other day, and he drew my attention to a peculiarity of the modern car. He said: "Have you ever noticed that sooting of pistons and cylinder heads is a modern complaint?" I remarked that I had not noticed it before, but when he brought it to my mind I did recall that some of the old cars which I had driven did not suffer from sooting. He told me that this was almost universally true.

Take the case of the old Panhards built back in 1902, for instance; not only did these cars not soot in the days when they were new, but they will not soot now, so that it cannot be a question of the quality of the gasoline or oil used. This is a curious phenomenon and one worthy of some attention. Why should the modern car soot its pistons and its elder brother not? The explanation must, of course, be sought in the points of difference between the two. Now, as to manufacture, there cannot be a great difference; the only thing possible is that the old cars had no ground cylinder liners and the new ones have; but it is difficult to account for matters on these lines. Compression is not much different. The old obsolete Wolseley car, for instance, had every bit as high a compression as the modern car; and even if the compression were a little higher now than formerly it is difficult to believe that a few pounds up or down could make the difference, otherwise one would expect that a leaky set of valves would make for the absence of sooting, and I have never heard of such a fact being noted.

The next point of difference to be noted between the old engine and the new is flexibility. The old engine had no flexibility; the new one has much. The old engine would scarcely run below half its maximum rate of speed; the new will run down to a fifth or less. Now, everyone who has examined a carburetor for slow running will have noticed that in order to get the slowest running of the engine a rich mixture is necessary, probably because the incoming charge is much diluted with burnt gases. Here, then, we have a pointer. A rich mixture would certainly make for soot on the piston head, as everyone knows who has been troubled with too large a carburetor jet, and it would seem that this might be the cause of the trouble.

If we are right in saddling this peculiarity of the modern engine with the responsibility for sooting, from which even the very best and most expensive cars suffer, it is worth while to inquire whether anything can be done to get rid of the trouble. It is necessary, therefore, to make one or two assumptions. Why should it be necessary to use a strong mixture for

slow running, occasioning as it does occasional black puffs of smoke from the exhaust?

Am I right in supposing that it is due to the burnt gases? If so, the only thing to do is to get rid of these gases or some of them, which points toward the scavenging charge with its reduced power.

Possibly, however, a compromise might be made. The richest mixture will probably be used when the engine is turning over doing no work, and as a matter of fact my own experiments point to this conclusion. If, then, we could insure the engine turning over "idle" with a weak mixture, we should probably do much to get rid of sooting.

Now the reason why an engine will not run at very slow speeds is, I believe, the

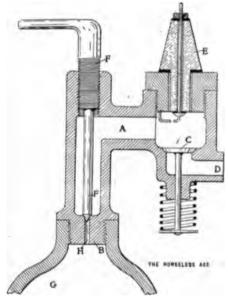


Fig. 1.

dilution to which I have referred, so that the problem we have to solve is the use of a sufficiently rich mixture round the sparking plug points to insure explosion, and at the same time the introduction of such a small amount of this mixture that neither soot will be deposited nor the engine driven above the minimum speed. In order to accomplish this it is obvious that we must, by some means, have a "cloudlet" of very good gas just round the plug points, and if, as is probable, this little cloud of gas has to be rich, then we must have excess of air in the immediate neighborhood to oxidize any soot formed by the explosion.

I beg to offer the device shown in section in Fig. 1 as a solution of the problem. I have already shown it to one competent engineer, who thinks that it might work all right.

Here A is a small chamber, of which the capacity would be determined by experiment, screwed into the sparking plug hole B of the

auxiliary ignition. (I shall speak later of the method of working where only one ignition is used.) C is a small automatic inlet valve communicating by the pipe D with a small carburetor, which may be of the wick type, as it will only have to supply very little gas. E is the auxiliary sparking plug and F is a screw down stop valve which, when screwed down, closes communication between the engine cylinder G and the cavity A.

The main carburetor throttle will be so arranged that when more than fully closed a hole will be opened to admit clean air to the cylinders, the size of this hole being determined by experiment.

The action of the device will be as fol-

On switching on the apparatus, which will be done by closing the main throttle and opening the screw valve F, the engine begins to draw clean air through the main throttle, and at the same time a rich mixture through the pipe D and the valve C. The sizes of the pipes and carburetor will be such that only about enough gas will be drawn in through D to fill the chamber A. On the compression stroke this gas will be compressed, together with a little of the air already introduced through the main throttle. The mixture thus diluted will be exploded by the spark of the plug E at the right time, and the resulting flash of flame will shoot down through the hole H into the clean air in the cylinder, where any unconsumed carbon and gases will be oxidized.

It seems to me that if this apparatus were carefully designed an engine might be made to run at almost any low speed, for the compression could be much reduced and still the mixture in the chamber A would be rich enough to fire with certainty.

The method of coupling up such a piece of apparatus on a four cylinder engine could safely be left to the designer, but I might suggest that if all four of the screw valves F were coupled up to one connecting rod projecting through the dashboard of the car, which could easily be done, then one pull or push on this rod would open all four (or six) valves and start up all the auxiliary explosion chambers at once. Thus, in such a car, as soon as the driver desired to stop, he would merely close his throttle and press the end of the control rod with his foot, when the auxiliary apparatus would at once come into play.

Should only one ignition system be used then it would be perfectly easy to arrange matters so that the motion of the rod coupling the valves would also throw the high tension wire from one plug to the other.

I believe that this apparatus would be well worth considering. Among other things it lends itself to the attention of the specialty man, for the explosion chambers if made to fit standard sparking plug threads could be fitted to any car with little trouble.

# OUR FOREIGN EXCHANGES ➤



### New British Motor Fuel.

hen the plan of the British Governt to impose a tax upon gasoline for n pleasure automobiles was announced. as predicted that this would lead to ievelopment of new fuels, as well as to perfection of carburetors so as to renthem more economical. Whether these ictions will come true or not, there already signs that promoters of new iretors and of fuels other than gasoline take advantage of the impending ine in the price of gasoline, and already w fuel, referred to as Homoil, is being lded in the press. This fuel, which is to be produced from coal tar, in Great in is subject to the same taxation as line, but it is claimed to be cheaper to contain more heat units than gaso-

It would seem from the somewhat e description of the fuel given in our ish contemporaries that the product is other than the well known benzol. rder to put it prominently before the ic a number of press representatives : taken in cars operated on this fuel 1 London to Mitcham. It is estimated 180,000,000 gallons of the fuel could roduced annually in the United King-It is stated that a particular make arburetor, known as the Grunewald, to be used for this fuel. The latter f the surface type, the fuel being abed by the air by passing the latter a large number of non-absorbent balls. th are kept moist by a constant supply he fuel. The specific gravity of the is 0.885. It is claimed that the Ger-Government use the Grunewald cartor in connection with a fuel similar to soil for their marine and military truck

: on Visiting Cars in England. ouring in Great Britain by nonish motorists who bring their cars g with them will be considerably more nsive next year if the budget propoof Chancellor of the Exchequer Lloyd rge are adopted. It is proposed by him lace a duty of \$10 to \$200 on visiting according to horse power. In addito the license for the car the visiting orist would have to pay a registration a license fee and a tax for the chaufas a male servant. This would make outlay which might reach the sum of , which would be practically prohibitive re only, say, a week's stay in the counis considered.

ne same proposal of imposing a tax ion-resident motorists was made in the ich Chamber of Deputies about a year the sponsors of the bill holding that gners might just as well pay for use of French roads as natives. It

was soon made clear to the deputies, however, that France derives great profit from the wealthy visiting motorists, and that it would be extremely unwise to place the least obstacle in their way or to curtail the inducements attracting them to France. The bill was killed.

Following the example of Berlin, the city government of Cologne has placed in service a motor truck for the removal of dead horses, etc. The vehicle is equipped with a 28x32 four cylinder motor and capable of carrying up to one and one-half tons useful load.

At a council meeting of the Society of Motor Manufacturers and Traders, held on June 17, applications for sanctions for automobile shows in Manchester, Dublin and Liverpool were considered. The association unanimously resolved that at present no other automobile shows than Olympia and Edinburgh are desirable, and no sanctions will be given for other shows.

According to the official statistics about 1,200 automobiles are at present owned in Sweden, almost one-half of them in Stockholm. One hundred of the latter are taxicabs, and the number of these cabs is rapidly increasing since the opening of the Art Trades Exhibition early in June. There are 334 horse cabs in service in the Swedish capital, but the owners of such cabs are constantly changing them for motor cabs. The city council recently increased the speed limit for these vehicles from 15 to 20 km. per hour.

According to a report of the English Board of Trade, there has been an enormous increase in the importation of gasoline into the United Kingdom recently. No less than 11,009,977 imperial gallons were imported during the month of May last, as compared with 5,860,150 gallons in May, 1908, and 5,781,465 gallons in May, 1907. The enormous increase in the importation is ascribed partly to the growth of the automobile movement, and partly to the threatened taxation of gasoline for use in pleasure vehicles. The total amount of gasoline imported during the first five months of the year was 27,996,235 gallons, while during the same period of 1908 only 13,674,397 gallons were imported.

The automobile service between the cities along the coast of Austria, along the Adriatic Seasand Cetigne, the capital of Montenegro, has been discontinued owing to a strike of the chauffeurs. The automobiles in this service carried the mails, and in order to keep up the mail service it was necessary to return to the old horse diligences, which require six hours for the trip over the artificial road between Cettaro and Cetigne, which is covered by the motor buses in two to three hours.

### Alcohol Buses in Madagascar.

An extended trial with the object of introducing the use of alcohol as fuel for the motor buses which are being operated in Madagascar has been made recently. Since January I last the motor bus service has been an auxiliary of the railroad service of the island, and within several months it will cover a route nearly 100 kilometres in length, ending at Antananarivo and the terminus of the railroad. These tests are said to have proven exceedingly satisfactory. The best results were obtained with a 90° alcohol mixed with 40 per cent. of benzol. The tests were made on a 15 horse power Panhard-Levassor car which weighed about 5,500 pounds. The fuel consumption per hour was 6.62 litres, which works out to 0.121 litres per ton-kilometre (21.5 ton-miles per U. S. gallon). The average speed was 21.92 kilometres (14 miles) per hour. These results are practically equal to those obtained with gasoline. The Central Distillery at Antananarivo, in accordance with a contract made with the Government, furnishes the litre of alcohol-benzol mixture for 0.78 franc, that is to say, at a considerably lower price than that asked for gasoline at Antananarivo, viz. 1.33 francs. At the present time the vehicles used in the motor service are operating on alcohol. It might be added that a decree issued on March 7, 1908, made alcohol manufactured in the colony and intended for industrial purposes, tax free.

# Glidden Tour Preliminaries at Detroit.

The Detroit Automobile Dealers' Association will hold a big banquet at the Hotel Pontchartrain Friday evening at which the Governor of Michigan and the mayor of Detroit will be honored guests. Invitations have been extended to all of the A. A. A. officials, and the Glidden tourists will be present. On Saturday evening the Automobile Club of Detroit will give a dinner at its country clubhouse to the A. A. A. directors. The monthly meeting of the executive committee, to which the directors have been invited by President Speare, will be held Saturday morning at the Hotel Pontchartrain, which will be the official headquarters.

W. O. Lum, of Amsterdam. N. Y., has recently brought out a patch for inner tubes known as the "Everstick" patch. He has now changed the name to the "Quicktite" patch, and is organizing a company for its manufacture. The patch is covered with a brown cement preparation on one side. When a repair is to be made, the surface of the tire around the puncture is cleaned with gasoline and the cement covered side of the patch likewise. Then the patch is pressed in place and the job is done.

### MINOR MENTION



The branch managers of the Winton Motor Carriage Company held their annual convention in Cleveland last week.

The McFarlan Company, Connersville, Ind., are building models of a touring car and a roadster, to sell at about \$2,500.

The Willen Manufacturing Company has been organized at Auburn, Ind., to manufacture automobile tire protectors. W. H. Willenar is at the head of the concern.

Next year the horse power of the \$3,000 Moon car will be increased from 35 to 40, and in addition the company will make a \$1,500 car rated at about 30 horse power.

A deal for the sale of the Twyford motor car shops in Brookville, Pa., to New York capitalists, who plan to manufacture motor driven farm machinery, is said to be under way.

The Reliance Motor Company, Owosso, Mich., has asked the city council to close Howard street for three blocks and Michigan avenue for one block to enable it to enlarge its plant.

It is reported that the American Motor Car Company, of Indianapolis, which built 200 cars this season, plans to turn out 300 for 1910. Deliveries of the 1910 models will begin on September 1.

A new company will take over the St. Louis Car Company, which will discontinue the American Mors to make a new six cylinder car of American design, with a motor of 50 horse power. The general manager is H. E. Walton.

The Ewing Automobile Company, of Geneva, Ohio, which employs about 100 men, is said to be planning to move away from that city because there are no amusements there, and it is impossible to keep machinists there. Erie, Pa., is said to be considered favorably as a location.

The Gemmer Manufacturing Company, Detroit, Mich., has just completed an addition to its factory building, 80x275 feet, of trussed steel and with concrete flooring. The company will shortly break ground for two other additions, which when completed will give it 200,000 square feet of floor space.

The Detroit Automobile Dealers' Association is strictly opposed to automobile track racing, and though it has been approached a number of times by promoters to give its consent to such races it has always refused to do so. The reason given by the association for its stand in the matter is that such races are entirely too dangerous.

Two high priced cars belonging to A. B. Leach, South Orange, N. J., were destroyed by fire on June 28, and about \$500 damage was done to the concrete private garage of Mr. Leach, which is built in the shape of a small railroad round house. The cause of

the fire is unknown. One of the cars stored in the building was saved by the chauffeur.

The Austin Automobile Company, Grand Rapids, Mich., are considering to locate in Elwood, Ind., in the old factory of the Pittsburg Plate Glass Works.

The Hartford Rubber Works Company, of Hartford, Conn., have adopted the Dow standard remountable rim, which they will market in connection with their Hartford automobile tires.

Klein & Mercer have established themselves as expert body draftsmen at 1777 Broadway, New York, and will prepare drawings for automobile bodies for both commercial and pleasure vehicles.

At a meeting of the rural free delivery mail carriers of York and Adams counties, Pa., at York, Pa., on July 3, State President C. C. Rich, of Lewisberry, spoke on the use of the motorcycle in rural mail delivery.

The Mitchell factory at Racine, Wis., was temporarily shut down on June 30 to take an inventory and to give the employees a chance to take part in the home coming celebration. Work will probably be begun again on July 8.

The East Oak Park Neighborhood Club of East Oak Park, near Chicago, have sent a petition to the village board in which they request the trustees to stop the erection of a garage in that section by Village Trustee T. L. Gongren of Oak Park.

The Model Automobile Company, Peru, Ind., have doubled their original capitalization, and decided to immediately erect two additional buildings which will give them 35,000 square feet additional floor space. We are informed that the additional capital stock was taken up by the old stockholders.

A fire which broke out during the night of June 29 did considerable damage to the garage of S. H. Peterson, Chicago, Ill., who handle the Pope-Waverley and Jewel cars; also to the plants of the Auto Tire Security Company and of the Chicago Coach and Carriage Company. The cause of the fire is unknown. The damage is estimate at \$20,000.

The Cleveland-Canton Spring Company, of Canton, Ohio, have recently occupied a new addition to their factory, which will be devoted entirely to the manufacture of automobile springs. The company has installed special gas heated kilns, which can be kept at a uniform temperature and in which the steel bars never come in contact with the flame for the heat treatment of their spring material.

R. R. Kimball, a well known Omaha, Neb., dealer, has had a special landaulet body built for a Cadillac "30" chassis, which he is now exhibiting at his garage. The interior is very luxuriously upholstered in Bedford whipcord, and has carpet, French trimmings and silk window shades. It is also fitted with card and perfume cases, and is equipped with electric lights, speaking tube and two special automatic folding seats. The wind shield is so constructed that when it is folded up it fastens to the

roof, and thus does not occupy any useful space.

Governor Fort of New Jersey is reported to have purchased an Oldsmobile Model D touring car from R. C. Manning, Oldsmobile agent at Trenton.

We are informed that the State Legislature of New Jersey recently made an appropriation for the purchase of a 45 horse power Rambler car for the use of the Executive Department of the State government.

The Northway Motor and Manufacturing Company, Detroit, Mich., has filed notice that at a meeting of shareholders it was voted to increase the capital stock of the company from \$100,000 to \$250,000. All of the increase has been paid in in cash.

The Davis Manufacturing Company, Park and Fifteenth avenues, Milwaukee, Wis., builders of motors and parts, have taken out a permit for the erection of a \$12,000 addition to the factory. The company last year erected large works at Park and Fifteenth avenues, and abandoned the plant on Sixth street, but the new quarters already are too small.

The office, accounting department and retail salesroom of the Auto Tire-Security Company, manufacturers of Kemizite, at 1231 Michigan avenue, Chicago, were slightly damaged by fire last week. The actual loss was trivial, and the retail department was doing business again in the garage three hours after the fire. The wholesale department is temporarily located at 1221 Michigan avenue.

Business men and automobile owners of Fort Wayne are trying to raise funds for a speedway near that city, and which, it is expected, would cost about \$200,000. The plan is to build a course about 20 miles long, near Fort Wayne, and hold a number of racing events. The proposed course would run 8 miles west of Fort Wayne, then go 4 miles south and return to Fort Wayne by another route.

It is reported that George Schebler, of Wheeler & Schebler, Indianapolis, is planning a racing car to be equipped with a twelve cylinder engine. It is said the engine will be rated at about 100 horse power, and that the cylinders will be of the double opposed type. The company has announced that it will give a \$5,000 silver trophy in connection with races on the Indianapolis motor speedway, and it is supposed the new car will participate in the events.

The main office of the Spare Motor Wheel of America, Ltd., has ben moved to the factory at St. Ann, Ill. The firm has gone into the manufacture of standard clincher automobile and motorcycle rims, in addition to the manufacture of the Stepney wheel. They also manufacture the Universal demountable rim of the Universal Rim Company, of Chicago. The American Distributing Company, of Indianapolis, Ind., will handle their entire output of automobile rims.

Up to June 15, 3,611 automobiles had been registered in the State of Washington.

Seventeen inspectors and four revenue agents on the denatured alcohol rolls of the Internal Revenue Bureau have been dismissed because their services are no longer needed. The use of denatured alcohol, especially in internal combustion engines, has not developed as rapidly as was expected.

The Carl Spoerer Sons Company, of Baltimore, Md., have just completed their 1910 demonstrating cars. They will produce two models during the coming year, viz., a 30 horse power and 50-60 horse power. The company exhibited their first machine at the Baltimore show last winter. Ten of these cars are now in course of assembling.

Following the precedent set last year, the Carriage Builders' National Association is again inviting manufacturers of automobile parts, accessories, etc., to exhibit at the C. B. N. A. national exhibition, which will be held in conjunction with their annual convention during the week of October 18 to 22, 1909, at Washington, D. C. Henry C. McLear, secretary of the association, Wilmington, Del., is manager of the show.

### Club Notes.

The A. C. A. has issued a pamphlet giving specific route directions for a tour through the Adirondack Mountains to Lake Champlain.

The Kearney (Neb.) A. C. is at present being organized by a number of motorists of that city, headed by Dr. C. K. Gibbons. A preliminary meeting was held at the City Hall on June 28.

The Plainfield (N. J.) A. C., which was recently organized with nineteen charter members, has elected the following officers: Dr. F. C. Ard, president; H. W. Marshall, vice president; J. H. Rankin, secretary, and F. O. Ball, treasurer.

The San Francisco Motor Club is planning a tire changing contest, to be held over a course around the bay, and to be combined with an economy contest. The details will be decided upon at the next meeting of the club.

Chairman Powell Evans, of the A. A. A. Touring Board, and president of the A. C. of Philadelphia, sailed last week to attend the annual Congress of the International League of Tourists' Associations, which will be held in London July 7 to 9.

H. L. Kramer, of Mudlavia, Ind., is endeavoring to interest Indianapolis drivers in making an endurance run to that resort under the auspices of the A. C. of Indiana. The club is planning a run some time during the fall, but it has been planned to run it to French Lick, which was the destination of the annual run last year.

The Denver Motor Club has retained Grant L. Hudson as attorney to defend the members of the club in test cases which have been brought in the anti-speed crusade now being carried on by the Denver

fire and police board. Since the crusade was inaugurated there have been a considerable number of arrests for speeding every day.

The Automobile Club of Cheyenne, Wyo., is building a 4 mile automobile speedway, and expects to hold a track meet on August 17.

The Springfield (Mo.) A. C., which has led a passive existence during the past two years, has decided to enter upon an active career, and at a meeting on June 23 elected the following officers: W. H. Horine, president; Holland Keet, vice president; J. E. Atkinson, secretary; Robert L. Pate, treasurer. It is planned to make a tour to Kansas City to see the finish of the Glidden Tour there on July 28.

At a meeting of the board of the Cleveland A. C. on June 26 C. A. Otis was elected chairman of the finance committee of the national convention board and John Ehrhardt was chosen secretary. This board will make the arrangements for the National Good Roads Convention which is to be held in Cleveland in the fall. It is planned to raise between \$5,000 and \$6,000 for the entertainment of the delegates and other necessary expenses.

The Michigan State A. A. held its annual meeting at Detroit on June 24, at which the following officers were elected: Edward A. Skaes, Detroit, president; J. R. Jackson, Grand Rapids, first vice president; Dr. D. Emmet Walsh, Grand Rapids, second vice president; J. C. Hartfield, Kalamazoo, third vice president; Dr. F. C. Warmshuis, Grand Rapids, secretary, and J. J. Ramsay, Detroit, treasurer. A vote of thanks was tendered retiring President Edwin S. George.

### Business Troubles.

A creditors' petition in bankruptcy has been filed against the International Generator Company, manufacturers of gas equipments for automobiles, motor boats, etc., at 244 West Forty-ninth street, New York, by Henry M. Reichenbach, of Yonkers, upward of \$3,000; William Shrive, of Yonkers, \$84, and Howard W. Beach, of East Orange, N. J., \$47. Preferential payments are alleged as acts of bankruptcy, and the concern is said to be owing upward of \$1,000. Judge Hand appointed Hamilton M. Dawes temporary receiver.

### Garage Notes.

Raban & Johnston, whose garage on Broad street, Portchester, N. Y., was burned last year, have opened a new fireproof garage on the same site.

Benjamin J. Hughes, Newark, N. J., has filed plans for a \$7,750 garage on Park avenue near North Eleventh street. The building will be 46x100 feet.

The International Automobile Co., Chicago, Ill., has moved to 2336 Wabash avenue, where it occupies a two story concrete building 55 feet wide by 175 feet deep.

The Cook-Buchanan Co., of Lake Mills, Wis., has erected a two story garage on Main street, Lake Mills, for the use of Seaver & Gericke, a

new agency, repair and garage concern. The entire basement will be devoted to repairs, and the first floor for storage and show rooms. This is the first garage in Lake Mills.

The new garage of A. E. Annett, located on Woodward avenue, Detroit, is nearing completion. A special feature of this garage will be an unusually complete repair shop.

usually complete repair shop.

Herman Heller and P. F. Dolan, of Shawano,
Wis., have purchased the Mehlhorn Building on
Main street, and opened a garage under the name
of Heller & Dolan Automobile Co.

M. C. Huie and A. J. Langford have purchased the garage and repair shop conducted under the name of the Columbia garage in Atlanta, Ga., which holds the agency for the Ford cars.

which holds the agency for the Ford cars.

E. W. Masterson, of Denver, Col., has bought the reinforced concrete garage of Horace B. Day, San Diego, Cal., for \$16,000. The garage is located on First street between B and D streets.

The W. L. Hibbard Motor Car Co., Milwaukee, Wis., State agents for the Chalmers-Detroit, Hudson and Thomas lines, has moved into its new garage on Wells street, between Third and Fourth streets.

For the Maxwell branch in Chicago a new four story structure, 80x160 feet deep, is being erected at Eighteenth street and Michigan avenue. It is hoped to have the building ready for occupancy by October 1.

The Jungclass Automobile Co., Cincinnati, Ohio, will build a garage at Reading road and Maple avenue, Avondale. The site is 70x50, and was purchased for \$7,500. The building will probably cost \$25,000.

The Autocar Agency in San Francisco has leased a site on the south side of Golden Gate avenue, between Van Ness avenue and Polk street, on which a reinforced concrete building will be erected for its San Francisco headquarters.

The McCurdy-May Motor Co. has been organized in Pittsburg to handle the Pierce-Arrow cars, and have secured headquarters in the former home of the Fort Pitt Automobile Co. on Baum street. E. C. McCurdy is secretary of the company.

Henry Kappelman is remodeling the livery barn of the Wisconsin House at Two Rivers, Mich., to use it as a garage and salearoom for automobiles. The building will be provided with a glass front. A stock of accessories and supplies will also be carried

The Maxwell-Briscoe Motor Co. have established a branch office in Philadelphia, and the Longstreth Motor Car Co., which formerly held the Maxwell agency in that city, relinquished it on July 1. Wm. F. Smith will have charge of the retail and wholesale business of the new branch, which will be conducted in the same quarters as heretofore.

The Philadelphia Studebaker branch, of which E. V. Stratton is manager, has taken over the rest of the allotment of E-M-F cars of the Foss & Hughes Co., the former E-M-F dealers. Hereafter the E-M-F car will be handled exclusively from the Studebaker salesrooms at 530 North Broad street. The transfer of an agency contract took effect on July 1.

The Motor Car Agency of Seattle have commenced the construction of a fireproof building at the corner of Broadway and Union street, where their salesrooms, garage and shop will be located. The building will be equipped with every modern facility, and will contain a floor area of 7,000 square feet. Fred Haines is manager of this new concern, and will handle the Pierce-Arrow lines during 1910.

John S. Lazarus, an Indianapolis capitalist, has built a garage in the heart of the residence district in order to give his two sons something to occupy their time. The garage is of reinforced concrete construction, of artistic design, and has no interior posts. It is well lighted by electricity, and is equipped with modern appliances for washing and caring for cars. S. A. Kepler, an expert machinist, has been employed. The plan of a public garage in an exclusive residence neighborhood is new in Indianapolis.

### **MOTOR VEHICLE PATENTS**

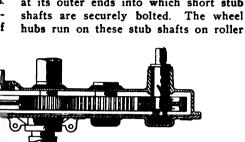
Reviews of Specifications.

921,705. Timing Gear Mechanism for Explosive Engines.-Lindley D. Hubbell, of Hartford, Conn., assignor to the Pope Manufacturing Company, Hartford, Conn. May 18, 1909. Filed April 27, 1908.

This invention relates mainly to provisions whereby the enclosing casing of

Propelling Mechanism for 022,372. Motor Driven Vehicles - Alexander Winton and Harold B. Anderson, of Cleveland, Ohio, assignors to the Winton Motor Carriage Company, Cleveland, Ohio. May 18, 1909. Filed October 30, 1906.

This invention relates to a live axle construction in which the load carrying and power transmitting members are separate. The load carrying member is of I section, and is provided with hubs at its outer ends into which short stub shafts are securely bolted. The wheel



No. 921,705.

the gearing for the cam shafts, magneto and pump is rendered oil-tight. In order to prevent the oil in the gear case from working through the various bearings the journals are provided with inclined grooves near their ends, in such a manner that when the cam shaft rotates the grooves collect any grease trying to escape through the bushing around the shaft and forces it back into the gear case. The cam shafts terminate within the gear case, and only the crank shaft extends through it, and the opening of the case for the crank shaft is rendered oil-tight by means of a stuffing box.

Vehicle Spring.—Lewis C. 921,947. Burnet, of Newark, N. J., assignor to



Burnet Compound Spring, Inc., Newark, N. J. May 18, 1909. Application filed August 24, 1907.

This spring is substantially a double elliptic spring, consisting of two elliptic springs, of which one is superposed upon the other. Each half of each elliptic spring consists of two or more leaves. The minor leaves of the upper and lower half are so arranged as to help the main leaf in carrying the load, while the minor leaves of the intermediate halves are so arranged as not to affect the load resting upon the main leaves of these halves, but to assist the main leaves in taking part of the load during the rebound.

bearings. The hubs are provided with combined brake drums and internally toothed gear crowns. With these internal gears mesh spur pinions which receive their power through shafts running parallel with the rear axle and provided with two universal joints each. The bevel driving gear and differential gear are carried in a housing supported from the carrying axle at or near the centre. A brake drum is supported independently of the driving mechanism, and the drum and propelling shaft have interlocking members.

### Patents Issued May 18, 1909.

921,656. Roller Bearing .- Herbert W. Alden, Canton, Ohio, assignor to Timken Roller Bearing Axle Co., Canton, Ohio, a corporation of Ohio. Filed April 15, 1907. Serial No. 368,314.

921,705. Timing Gear Mechanism for Explosive Engines.—Lindley D. Hubbell, Hartford, Conn., assignor to the Pope Manufacturing Co., Hartford, Conn., a corporation of Connecticut. Filed April 27, 1908. Serial No. 429,524.
921,710. Pneumatic Tire.—Grant Jacobs, Des

Moines, Ia. Filed March 13, 1908. Serial No. 420,941.

Transmission Gearing.-John M. Van 921,754. Dyke and Fayette R. Rowell, Canastota, N. Y. Filed September 8, 1908. Serial No. 451,951.

921,862. Vehicle Spring.-Edmon M. Mayhew, Mooresville, N. C., assignor of one-half to T. H. Pegram, Mooresville, N. C. Filed November 11, 1908. Serial No. 462,132.

921,933. Engine Starter.-Daniel C. Wilgus,

Los Angeles, Cal. Filed May 29, 1907. Serial

No. 376,350.
921,947. Vehicle Spring.—Lewis C. Burnet, Newark, N. J., assignor to Burnet Compound Spring, Inc., Newark, N. J., a corporation of New Jersey. Filed August 24, 1907. Serial No. 389, 945.

921,963. Automobile Vehicle.—Leonard H. Dyer, Washington, D. C., assignor to Enterprise Automobile Company, Hasbrouck Heights, N. J., a corporation of New Jersey. Filed February 3. Serial No. 3,880. Renewed September 22, 1908. Serial No. 454,155.

921,978. Compensating Gear.—Edwin J. Gould, Boulder, Col., assignor of one-fourth to James A. Walker, Boulder, Col. Filed April 3, 1908. Serial

No. 424,997.
921,994. Variable Speed and Reversible Gear.
—George P. Innes and Thomas Con Allen, Sydney, New South Wales, Australia. Filed May 18, 1908. Serial No. 433,508.

921,995. Auxiliary Starting Device for Automobiles.—James W. Jackson and Frank Jackson, Denver, Col. Filed December 18, 1908. Serial

No. 468,163.

Steering Mechanism for Vehicles.— 922,044. Steering Mechanism for Vehicles.— Albert F. Rockwell, Bristol, Conn., assignor to the New Departure Manufacturing Co., Brist Conn., a corporation of Connecticut. Filed November 3, 1905. Serial No. 285,730.

922,055. Automatic Swivel Lamp for Automobiles.—Julius O. Spang, Halleybury, Ontario, Canada, assignor of one-half to John Edward Hammell, Halleybury, Canada. Filed December 17, 1908. Serial No. 468,028.

922,145. Carburetor.—Albert Howarth, Providence, R. I., assignor to Standard Carburetor Company, Providence, R. I., a corporation of Rhode Island. Filed May 31, 1907. Serial No. **276,616.** 

928,278. Automobile Wheel.—Ole A. Hamre, Arriba, Col. Filed July 26, 1907. Serial No. 385,698.

922,284. Apparatus for Determining the Depth of Liquids.-Joseph W. Jones, New York, N. Y. Filed December 13, 1906. Serial No. 347,670.

922,299. Headlight Adjuster for Automo Leonard M. Leach, Fort Worth, Tex. January 18, 1909. Serial No. 472,779.

922,367. Driving Mechanism for Motor Driven Vehicles.—Samuel M. Vauclain, Philadelphia, Pa., assignor to Burnham, Williams & Co., Philadelphia, Pa., a firm. Filed June 20, 1908. No. 439,542.

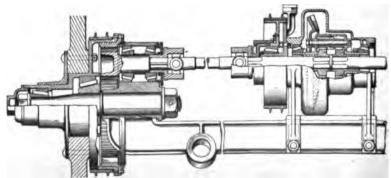
Propelling Mechanism for 922,372. Motor Driven Vehicles.-Alexander Winton and Harold B. Anderson, Cleveland, Ohio, assignors to the Winton Motor Carriage Co., Cleveland, Ohio. Filed October 30, 1906. Serial No. 341,268.

922,402. Demountable Tire Rim.—Alexander

Dow, New York, N. Y., assignor to Dow Rim Co., a corporation of New York. Filed December 30, 1908. Serial No. 470,052.

922,403. Locking Device for Demountable Tire Rims.—Alexander Dow, New York, N. Y., assignor to Dow Rim Co., a corporation of New York. Filed January 29, 1909. Serial No. 474,-989.

Demountable Tire Rim.-Alexander 922,404. Dow, New York, N. Y., assignor to Dow Rim Co., a corporation of New York. Filed January 29, 1909. Serial No. 474,990.



No. 922,372.

### Patents Issued May 25, 1909.

922,454. Vehicle Spring.—Lewis C. Burnet, Newark, N. J., assignor to Burnet Compound Spring, Inc., Newark, N. J., a corporation of New

Jersey. Filed September 11, 1908. 922,489. Motive Power for Automobiles, etc. Edward S. Lea, Trenton, N. J., assignor, by mesne assignments, to Robert Wolstenholme, Philadelphia, Pa. Filed November 9, 1907. Serial No. 401.420. Renewed December 17, 1908.

922,528. Cut-out Attachment for Internal Combustion Engines.—Benjamin F. Sheibley and Wilhelm Moller, Lewistown, Pa. Filed April 25,

Tire Tool.-Tames A. Swinehart. Akron, Ohio. Filed May 29, 1908.

Muffler Cut-out Mechanism.-Lee S. 922,563. Chadwick, Pottstown, Pa. Filed March 8, 1909.
922,599. Reversible Transmission Gearing. 922,599. Reversible Transmission Gearing.— Moses W. Kouns, Columbus, Ohio, assignor to the

Ohio Manufacturing Co., Upper Sandusky, Ohio, a corporation of Ohio. Filed May 4, 1908. 022,604. Double Tank Fuel System .- Hermann Lemp, Lynn, Mass., assignor to General Electric Co., a corporation of New York. Filed August 1,

Pneumatic Tire.-Frank Reddaway, Pendleton, Manchester, England. Filed February 18. 1008.

Power Transmission Mechanism for 922,634. Motorcycles and Other Vehicles.—George W. Sherman, New York, N. Y. Filed November 14, 1908. Spring Wheel.-Elias B. Anderson, 922,658. Rock Falls, Ill. Filed June 25, 1908.

922,669. Spare Tire Cover.—Hyman Cohen, Brooklyn, N. Y. Filed December 21, 1908. 922,673. Ignition System for Internal Combustion Engines.—Mark B. Crist, Pittsburg, Pa., assignor to the Westinghouse Machine Co., a corporation of Pennsylvania. Filed February 15, 1906. 922,737. Spoke.—Thomas H. Walbridge, To-ledo, Ohio. Filed October 29, 1906. 922,739. Tire Protector.—Edward J. Weidner,

Lindsay, Neb. Filed October 15, 1908.

222,741. Exhaust Dissipating Apparatus for Motor Vehicles.—George E. Whitney, Boston, Mass., assignor, by mesne assignments, to Stanley Motor Carriage Co., a corporation of Massachu-

setts. Filed December 1, 1899. 922,752. Electric Train or Vehicle.—John L. Creveling, New York, N. Y. Filed March 26, 1903. 922,757. Steering and Turning Device for Vehicles.—John M. Eadie, New York, N. Y., assignor to Eadie Vehicle Gear Co., a corporation of New Jersey. Filed June 11, 1907.

922,764. Igniter Timing Device.—James G. Heaslet, Detroit, Mich., assignor to the Garford Co., Elyria, Ohio, a corporation of Ohio. Filed July 17, 1907.

922,826. Headlight.-Richard H. Welles, nosha, Wis., assignor to the Badger Brass Manufacturing Co., Kenosha, Wis., a corporation of Wisconsin. Filed September 19, 1907.

922,916. Brake Operating Mechanism for Motor Vehicles.-Paul Krause, Babylon, N. Y. Filed

August 26, 1908.
022,965. Clutch Gear for Hubs of Vehicles. Bernhard Settergren, Chicago, Ill., assignor to

John Gubbins, Chicago, Ill. Filed June 6, 1906.
923,043. Slip Coupling.—Edward J. Gulick,
Mishawaka, Ind. Filed July 11, 1907.
923,044. Gear Transmission Mechanism for Automobiles.—Edward J. Gulick, Mishawaka, Ind. Filed August 15, 1907.

923,045. Torsion Tube Support for Rear Axle Housings of Automobiles.—Edward J. Gulick, Mishawaka, Ind. Filed September 13, 1907. 923,046. Gas Engine.—Edward J. Gulick, Mish-

awaka, Ind. Filed May 27, 1907.
923,059. Vehicle Tire.—Allison M. MacFarland,

Philadelphia, Pa., assignor, by direct and mesne assignments, of fifteen one-hundredths to William W. Gibbs, one one-hundredth to Charles H. Heustis, and three one-hundredths to William W. Weigley, Philadelphia, Pa., and sixty-four one-hundredths to William C. L. Eglin and Joseph B. Mc-Call. Filed July 11, 1908.

923.073. Indicator for Liquid Fuel Tanks .-Sarah H. Peckham, New York, N. Y., assignor to

Hanks Gasoline Meter Co., New York, N. Y., a corporation of New York. Filed November 5, 1907.
923,104. Wheel Tire.—Anson R. Bangs, New
York, N. Y. Filed July 29, 1908.

Patents Issued June 1, 1909.

162. Shock Absorber for Vehicles.—Ed-923.162. Shock Absorber for ward A. Garvey and Christopher A. Garvey, St. Louis, Mo., assignors to the American Auto Ap-

pliance Co. Filed January 9, 1908.
923,167. Motor Vehicle.—Stephen B. Gray,
Jacksonville, Ill.; Bartlett S. Gray executor of said Stephen B. Gray, deceased. Filed July 14,

923,205. Wheel for Road Vehicles.—Feaster Shaw, Bishop Auckland, England. Filed January 18, 1908.

Steering Gear .-- Charles F. Strawn, 923,210. Philadelphia, Pa. Filed December 26, 1908. 923,230. Steering Gear.—Abram D. Wilt, Jr.,

Detroit, Mich. Filed November 25, 1908. 923,279. Pneumatic Tire.-Alexander Latimer, London, England. Filed June 8, 1907.

923,295. Continuous Track Light Attachment for Automobiles.—John M. Pitney, Jr., Lorain, Ohio. Filed January 11, 1909.
923,322. Automobile Tire Protector.—Andrew

B. Boughan, Chicago, Ill. Filed April 6, 1908. 923,332. Anti-Skidding Device.—Louis J. Clergy and Henry Morrow, Belt, Mont. Filed

January 21, 1908.

923,379. Inflation Valve.—Joun.

Litchfield, Conn. Filed August 1, 1907.

023,377. Carburetor.—Gustave F. Schmidt,

one-hundredths to Henry T. Teel, Richmond, Va., and one-half to the Cardwell Machine Co., Richmond, Va., a corporation of Virginia. Filed March 27, 1908. 923,422. Valve Operating Mechanism.—George W. Dunham, Lansing, Mich., assignor to Olds Motor Works, Lansing, Mich., a corporation of Michigan. Filed April 23, 1906.

923,436. Resilient Vehicle Wheel.—Herbert G.

Mackinney, Providence, R. I. Filed November 11,

Timer and Distributor.-Harry L. 923,442. Radford, Orange, Mass., assignor to Grout Brothers Automobile Co., Orange, Mass., a corporation of Massachusetts. Filed August 9, 1905.

923,443. Universal Joint.—Bert O. Rhodes. Kalamazoo, Mich., assignor of one-half to Clovis V. Salisbury, Kalamazoo, Mich. Filed November 20, 1907.

923,456. Anti-Slip Device.—William M. Stevenson, Indian Orchard, Mass. Filed February 7, 1008.

Variable Speed Gear .- Perry C. Wil-923.472.

liamson, Oakland, Cal. Filed May 19, 1908. 923,491. Explosive Engine.—Robert W. Coffee, Richmond, Va., assignor to Lewis M. Kelzer, Baltimore, Md. Filed May 8, 1908. Renewed March 20, 1000.

923,516. Resilient Tire.—Nels H. Hassel, Los Angeles, Cal. Filed October 28, 1907.

923,536. Internal Combustion Engine.—John A. Kitchen, Lancaster, England. Filed December 28, 1908.

Fluid Clutch Speed Controller and Power Transmitter.—Robert E. Newcomb, Holyoke, Mass. Filed March 7, 1908.

Combined Vibrator and Timer.-Wil-923,566. liam S. Newcomet, Philadelphia, Pa. August 24, 1908.

923,583. Steering Gear for Vehicles.—David E. Ross, Brookston, Ind., assignor to Ross Gear

and Tool Company, Lafayette, Ind., a corpora-tion of Indiana. Filed May 14, 1906.

923.613. Clutch.—Leonard Atwood, Philadel-phia, Pa., assignor of one-half to Albert L. Register, Ardmore, Pa. Filed May 11, 1907.

923,632. Motor for Automobiles .-- Mortimer Eastman and William Eastman, Roslyn, N. Y. Filed November 24, 1908.

923,636. Change Speed Gear for Powell Evans, Philadelphia, Pa. Filed May 10, 1906. Serial No. 316,086. Renewed November 4, 1908.

923,643. Spring Wheel.—Theodore W. Gratz, Jr., Olean, N. Y. Filed January 23, 1907.

923,707. Spring Wheel.—James E. Rielly, New-

ark, N. J. Filed September 21, 1907.
923,733. Puncture Proof Tire.—Eugene J. C. Timerman, Syracuse, N. Y., assignor of one-third to Louis C. Crowell, Syracuse, N. Y. Filed July 31, 1908.

923,764. Vehicle Suspension.—Frederick D. Brown and Walter D. Whitney, Minneapolis, Minn. Filed March 16, 1908.

923,765. Spring Suspension.—Alanson P. Brush, Detroit, Mich. Filed October 6, 1906.

923.787. Variable Drive Mechanism. B. Gray, Jacksonville, Ill.; Bartlett S. Gray executor of said Stephen B. Gray, deceased.

April 6, 1905. 923,788. Variable Speed Mechanism.—Stephen B. Gray, Jacksonville, Ill.; Bartlett S. Gray executor of said Stephen B. Gray, deceased. Filed May 5. 1006.

Motor Vehicle,-Stephen B. Gray. 923,789. Jacksonville, Ill.; Bartlett S. Gray executor of said Stephen B. Gray, deceased. Filed February 24, 1908.

Reissue 12,966. Power Transmitting Mechanism for Automobiles.—Louis P. Mooers, Geneva, Ohio, assignor to the Peerless Motor Car Co., Cleveland, Ohio, a corporation of West Virginia. Filed April 13, 1909. Serial No. 489,744. Original No. 832,991; dated October 9, 1906.

### Patents Issued June 8, 1909.

923,825. Automobile Turntable.-Charles K. Elmer, St. Paul, Minn. Filed October 29, 1908. 823,849. Mud Guard.—Bryan L. Jonse, Highbury, London, England. Filed February 3, 1908. 923,858. Cushioning Device.-Frederick O. Kilgore, Minneapolis, Minn., assignor to Kilgore

Manufacturing Company, Oldtown, Me., a corporation of Maine. Filed December 22, 1905. 923,881. Hydro-pneumatic Wheel.-Henri Oudi-

not and Charles Putois, Paris, France. Filed June 15, 1008. 923,900. Friction Clutch.-Joe E. Shearer, San

Francisco, Cal., assignor to California Clutch Company, San Francisco, Cal., a corporation of California. Filed July 25, 1908.

923,019. Vehicle Hub.—William R. Wilson, Cin-

cinnati, Ohio. Filed March 5, 1908.

923,938. Clutch Mechanism for Motor Vehicles. -Robert H. Bowman, Canon City, Col. Original application filed October 30, 1907, Serial No. 399,-908. Divided and this application filed May 5, 1008.

923,956. Oil Clutch and Speed Regulator.— Hugo Dotzer, Seattle, Wash. Filed December 31,

924,036. Spring Wheel.—Richard H. Burgess, Mullin, Tex. Filed September 30, 1907.

924,044. Apparatus for Injecting Fuel into Internal Combustion Motors .- Fritz Dürr, Frankforton-the-Main, Germany. Filed December 17, 1907.
924,061. Running Gear for Automobiles.—Herman J. Hass, Buffalo, N. Y., assignor to E. R. Thomas Motor Company, Buffalo, N. Y. Filed April 14, 1906.

924,102. Pneumatic Tire.-Frederick H. Perry, Beverly, Mass. Filed December 30, 1908.

924,139. Vehicle Wheel.—Frank Bradley and Frank H. Fairchild, Detroit, Mich., assignors of one-third to Charles C. Bradley, Mount Clemens, Mich. Filed March 26, 1906.

924,148. Folding Box Seat.—George E. De Vore, Lansing, Mich. Filed December 16, 1908. 924,179. Shock Absorber.—Henry Muchihausen. Jr., and Johannes Thomsen, Chicago, Ill. Filed August 17, 1908.

924,182. Automobile Scenic Railroad.—Asa G. Neville, Wellsburg, W. Va. Filed December 15, 1908.

924,186. Tire Casing .- John F. Palmer, Chicago, Ill. Filed October 14, 1907.

924,187. Universal Joint Coupling.-Friedrich Panse, Essen-on-the-Ruhr, Germany, assignor to Fried. Krupp Aktiengesellschaft, Essen-on-the-Ruhr, Germany. Filed June 27, 1907. 924,188. Holder for Lap Robes.—Charles B.

Phillips, Red Wing, Minn. Filed October 9, 1908. 924,513. Gas Lighting System for Automobiles. -Ernest Timmerhoff, Warsaw, Ind. Filed February 8, 1000.

Carburetor .- Alfred C. Stewart, Los 924,200. Angeles, Cal. Filed November 25, 1907.

Tire Casing .- John F. Palmer, Chi-924,267. Tire Casing.—John cago, Ill. Filed January 2, 1906.

Tire Casing.-John F. Palmer, Chi-924,268.

cago, Ill. Filed January 2, 1906. 924,323. Transmission Gear for Propeller Shafts and the Like.—Paul Daimler, Untertürkbeim, near Stuttgart, Germany, assignor to Daimler-Motoren-Gesellschaft, Stuttgart, Germany. Filed November 12, 1908.

924,334. Vehicle Wheel .- James R. Minneapolis, Minn., assignor to Fouch Disc Wheel Company, Minneapolis, Minn., a corporation of Minnesota. Filed February 9, 1905.

924,571. Tire Casing.—John F. cago, Ill. Filed October 12, 1905. Tire Casing.-John F. Palmer, Chi-

924,572. Pneumatic Tire.-John F. Palmer, Chicago, Ill. Filed March 23, 1908.

924,614. Vehicle Wheel.—Louis A. Hill, Wash-gton, D. C., assignor to American Resilient ington. Wheel Company, a corporation of Delaware. Filed April 3, 1908.

924,621. Cushioned Vehicle Wheel.—William C. McCarty, Birmingham, Ala. Filed December

### Patents Issued June 15, 1909.

924,640. Explosion Engine.-Harry M. Cramer, Lansing, Mich. Filed April 20, 1908.

024.673. Carburetor.—James B. Knickerbocker. Indianapolis, Ind. Filed November 21, 1907.

924,806. Anti-Skidding Attachment for Wheel Tires.—George A. Lyon, Philadelphia, Pa. Filed March 18, 1907.

924,817. Shock Absorber,-Charles H. Newton, Torrington, Conn. Filed October 27, 1906.
924,820. Automobile Truck.—Herbert L. Par-

rish, Benton Harbor, Mich. Filed February 28, 1908.

924.812. Pneumatic Tire.-Daniel McArthur. Jersey City, N. J. Filed April 15, 1908. 924,847. Variable Speed and Reversing Gear-

-Arthur C. G. Smith, London, and Edward H. J. C. Gillett, Hounslow, England. Filed August 5, 1908.

924,863. Spark Ignition Device for Explosive Engines.-James A. Whitton, Los Angeles, Cal. Filed November 26, 1907.

924,889. Variable Speed Gearing.—Gu Chédru, Buffalo, N. Y. Filed July 16, 1907. Gearing.—Gustave

924,924. Tire Armor.—William O'Neil, Milwau-kee, Wis. Filed August 14, 1908. 925,021. Vehicle Wheel.—Hartwig O. Peck,

Portland, Ore. Filed December 7, 1907.

Vehicle Wheel.-Hartwig O. Peck, 925,022. Portland, Ore. Filed July 9, 1908. 925,027. Vehicle Wheel.—Richard H. Rice, Lynn, Mass. Filed February 9, 1907.

925,078. Rotation Indicating Instrument.— Harry P. C. Browne and William H. Palmer, Jr., New York, N. Y. Filed July 18, 1907.

925,141. Dust Guard.-Albert E. Smith, South Bend, Ind. Filed November 23, 1907.

925,258. Lubricating System for Automobiles .-Alexander Winton and Harold B. Anderson. Cleveland, Ohio. Filed December 19, 1908.

925,376. Ball Bearing.-Ross S. Phillips, Milo Harris and John F. Dearing, Jamestown, N. Y. Filed April 15, 1907.

925,405. Tire Armor.—Rufus W. W. Francisco, Cal. Filed August 12, 1908. Tire Armor .- Rufus W. Welty, San

925,418. Horn.-Irvin N. Benson, Hartford, Conn. Filed March 26, 1908.

### Patents Issued June 22, 1909.

925,528. Pneumatic Brake for Motor Vehicles. Ernest E. Sweet, Detroit, Mich., assignor to Cadillac Motor Car Co., Detroit, Mich., a corporation of Michigan. Filed January 11, 1908. 925,532. Demountable Rim .- Benjamin R. Till-

son, Portland, Me. Filed September 14, 1908. 925,536. Vehicle Wheel Bearing Mechanism.— Clarence F. Umholtz, Bristol, Va. Filed March 23, 1908.

925,543. Vehicle Brake.-Joseph H. Wesson, Springfield, Mass. Filed June 30, 1908.
925,559. Auxiliary Spring.—Wallace C. Brown,

Toronto, Ontario, Canada. Filed June 4, 1908.

Tire.-Charles H. Keiffer, Akron, 925,580. Ohio. Filed January 25, 1909.

925,640. Timer.-Fred A. Putnam, Melrose, Mass., assignor to Sewing Machine Supplies Company. Boston, Mass., a corporation of Massachusetts. Filed September 18, 1908.

925,676. Vehicle Lamp.—Horace W. Beebe,

New Haven, Conn. Filed April 19, 1909. 925,711. Vehicle Wheel Tire.—George W. Lilley, Pontiac, Mich., assignor of one-half to John Watchpocket, Pontiac, Mich. Filed July 13, 1908. 925,720. Vehicle Lamp.-John K. Punderford,

New Haven, Conn. Filed January 18, 1909. 925,721. Vehicle Lamp.—John K. Punderford, New Haven, Conn. Filed April 19, 1909.

925,740. Attachment for Running Gears of Vehicles.—Charles E. Abrams and Charles H. Mason, Chatham, N. Y. Filed January 22, 1908. 925.793. Internal Combustion Motor.-Charles H. Atkins, Springfield, Mass. Filed June 7, 1905. 925,908. Wheel for Road Vehicles.—James Henderson, Bruton, England. Filed August 17, 1907.

Wheel Tire.-Joshua D. Marvil. 025.030. Laurel, Del. Filed September 11, 1908.

Elastic Vehicle Tire .- Charles Motz, 925,937. Akron, Ohio. Filed July 31, 1908.

925,969. Tire Patch.—John A. Wheeler, On-away, Mich. Filed March 30, 1909.

925,973. Carburetor.-Alexander Winton and Harold B. Anderson, Cleveland, Ohio, assignors to the Winton Motor Carriage Co., Cleveland,

Ohio. Filed April 9, 1907.
926,012. Elastic Vehicle Tire.—Charles A.
Motz, Akron, Ohio. Filed September 26, 1906. 926,039. Carburetor.—Edward F. Warren, De troit, Mich., assignor of one-half to Maurice E. Garrett, Wayne County, Mich. Filed July 22, 1008.

926,066. Multiple Contact Timer .- Edwin S. Lincoln, Brookline, Mass., assignor to Electric Goods Manufacturing Co., Boston, Ma corporation of Maine. Filed May 5, 1908. Mass.,

### Patents Issued June 29, 1909.

926,104. Tire Protector.—Frank H. Davis, Chicago, Ill. Filed December 2, 1907.

926,118. Folding or Collapsible Top for Automobiles.—Herman M. Hoelscher, Chicago, Ill. Filed November 5, 1908. 926,141. Clutch.—Charles Schmidt, Cleveland,

Ohio, assignor to the Peerless Motor Car Company, Cleveland, Ohio, a corporation of West Vir-

ginia. Filed January 15, 1906. 926,147. Turntable.—Albertus O. Slentz, Canton, Ohio, assignor of one-half to the Canton Foundry and Machine Company, Canton, Ohio, a corporation of Ohio. Filed April 23, 1909.

926,176. Spring Buckle for Securing Springs Axles .- Paul Daimler, Unterturkheim, Germany. Filed October 25, 1906. 926,186. Automobile Advertising Device.—

George Heales and Walter R. Neall, Baltimore, Md. Filed April 20, 1908.

926,195. Trunk.—Isidore S. Kallis, New York, and Joseph Berg, Brooklyn, N. Y. Filed November 2, 1908.

926,290. Motor Vehicle.—Louis S. Ross, Newton, Mass. Filed July 24, 1906.

926,296. Vehicle Wheel Rim.-Edwin C. Shaw, Akron, Ohio, assignor to the B. F. Goodrich Company, Akron, Ohio, a corporation of Ohio. Filed January 6, 1906.

926,313. Traction Wheel.—Chester T. Bangs, Chicago, Ill. Filed December 10, 1906. Serial No. 347,016. Renewed January 9, 1909.

926,330. Electric Ignition Device.-Theodore Hubert, New York, N. Y., assignor to Charles F. Splitdorf, New York, N. Y. Filed April 4, 1906. 926,347. Pneumatic Tire.—Maurice Marcille,

Paris, France. Filed December 29, 1906. 926,390. Motorcycle.—John David, Geneva, Switzerland, assignor to J. David & Cie., Geneva, Switzerland. Filed October 3, 1906.

926,411. Motor Vehicle.—Henry P. Haushalter, Milwaukee, Wis. Filed July 22, 1908.

Tire .- John C. Raymond, New York, 926,439. N. Y. Filed October 5, 1908.

926,533.. Carburetor.-Alexander Winton and

Harold B. Anderson, Cleveland, Ohio, assignors to the Winton Motor Carriage Company, Cleveland,

Ohio. Filed March 9, 1907.
926,540. Engine.—Henrik E. B. Blomgren,
Palmyra, N. J. Filed January 27, 1906.

926,557. Drive Gearing.-Norman Frye, Lin-

coln, Kan. Filed October 26, 1908. 926,598. Carburetor.—William L. Perry, Scrana. Filed December 27, 1907.

Vehicle Wheel.—Guy C. 926,650. Berwyn, Ill., assignor to the Perfection Emergency Company, Chicago, Ill., a corporation of Il-

linois. Filed October 29, 1908.
926,685. Upthrow Cushion Spring for Vehicles. -Charles L. Thomas, Canisteo, N. Y., assignor of one-half to Frank Caulkings, Canisteo, N. Y. Filed March 3, 1908.

926,695. Vulcanizing Apparatus for Tire Tubes Covers.-William R. S. Frost, London, Eng-

land. Filed February 6, 1909.
926,701. Steam Generator Flue.—Charles F. 926,701. Steam Generator Flue.—Charles a. Jenkins, Washington, D. C., assignor, by direct and mesne assignments, to General Electric Company, a corporation of New York. Original application filed August 27, 1901. Serial No. 73,471. Divided and this application filed January 2, 1907.

### New Incorporations.

Auto Parts Co., Chicago, Ill.-Capital stock, \$50,000. Incorporators, Bert Symons, Archie Symons and Frank Keown.

Piper Lowry Auto Co., San Antonio, Tex.-Capital stock, \$15,000. Incorporators, F. A. Piper, Sr.; W. E. Lowry and P. H. Long.

The Farmersville Auto Co., Farmersville, Tex.—

Capital stock, \$2,400. Incorporators, E. W. Stewart, J. B. Honaker, A. F. Yeager and others.

The Queen City Auto Livery Co., Buffalo, N. Y. —Capital stock, \$25,000. Incorporatora, Chas. V. Roty, Harry C. Shufeldt and Wm. J. Hickey.

Mechanical Tire Co., Jersey City, N. J.—To manufacture rubber tires, etc. Capital stock, \$500. 000. Incorporators, H. C. Coughlan, S. A. Anderson, C. B. Leggett.

The Chalmers-Detroit Motor Car Co., of Dayton, Ohio.—Capital stock, \$5,000. Incorporators, Ernest Ooley, Joseph H. Ooley, Albert Emanuel, Benjamin J. Ooley and Geo. W. Schaeffer.

Waddell & Emerson Stage Co., North Creek, N. Y.—Capital stock, \$12,000. Incorporators, R. Waddell and Robert Waddell, of North Creek, and James A., Margaret and Louis M. Emerson, of Warrensburgh.

The Auto Car Service Co. of New Jersey, Camden, N. J.-Objects, to manufacture, sell and operate automobiles and other vehicles, and to establish a public garage. Capital stock, \$10,000. Incorporators, E. A. Fitts, David S. Ludlum, John

### Trade Personals.

Wm. C. Longstreth has severed his connection with the Longstreth Motor Car Co., Maxwell dealers in Philadelphia, and plans to secure the Philadelphia agency for a number of different makes for the coming season.

Chapin, treasurer and general manager of the Chalmers-Detroit Motor Co., will sail for Europe the middle of this month. He will visit England, France, Germany and Italy, attend a number of automobile events, and return in September.

A. W. Hall, formerly of Cleveland, Ohio, has assumed the management of the Plymouth Truck Co., Plymouth, Ohio. He has withdrawn from the firm of Hall Brothers, 1613 Euclid avenue, Cleveland, agents for the Plymouth truck and the Cartercar, which business will be continued by his brother, V. R. Hall, under the firm name of the V. R. Hall Automobile Co.

R. Harry Croninger, general manager of the Penasylvania Auto-Motor Co., Bryn Mawr, Pa., has resigned, and has been succeeded by Dr. Caspar Miller, a large stockholder in the company. It is reported that Croninger, who was formerly sales manager of the Dayton Motor Car Co., will go to the Pacific Coast. He returned only recently from a business trip to that section of the country.

# The Horseless Age

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#### The Vaporizing Function of the Carburetor.

By ALBERT L. CLOUGH.

The most pressing question in the automobile industry at the present time is that of carburation, and the most urgent feature of that question is to be found in the vaporization phase of the problem. The proportioning function is fairly well performed by many carburetors and very well by some, but perfectly, perhaps, by none. However, there is always manual regulation to fall back upon to make good the shortcomings of carburetor automaticity, and provisions for such supplementary manual control are being provided quite generally of late. But if a carburetor fails to carburate, that is, if it fails to add to the entering air a due proportion of fuel in vapor form, it falls short of its purpose.

VAPORIZATION MUST PRECEDE COMBUSTION.

An internal combustion engine can be operated without any carburetor per se. A measured quantity of fuel can be squirted upon the inlet valve during each suction stroke or introduced into the combustion space through a special injection nozzle, This practice is common in stationary work, where low rotary speeds prevail. The valve and the port walls and other adjacent surfaces swept by the entering charge constitute the vaporizing surfaces under these circumstances, and they have the advantage over the evaporating surfaces of many carburetors of being in a constantly heated condition. During the compression period, in such an engine, high temperatures are reached on account of the high pressure carried, and vaporization is thus completed. Such engines run at low speeds, and the time allowed for the heat interchanges resulting in vaporization (and vaporization is solely a phenomenon of heat transference) is several times that available in a vehicle motor. When less than the requisite time is allowed for the cycle, the extent and temperature of the vaporizing surfaces remaining the same, the evaporation of the fuel will be incomplete at the end of the compression stroke. Liquid fuel cannot burn as such, and fuels can only unite with oxygen when in the aeriform condition. Whatever fuel remains in the liquid condition up to the beginning of exhaust is ejected unburned, and all fuel failing of vaporization up to the end of the compression stroke is very inefficiently utilized. To make an engine operate efficiently at high speed, when fed by the injection system, an extent of highly heated surface must be exposed to the fuel and air beyond that possible of provision in practice.

GAS ENGINE MIXTURES IDEAL.

An ideal gasoline carburetor should deliver the fuel mixture in as completely aeriform a condition, that is, as free from entrained liquid hydrocarbon, as does the mixing valve of a gas engine; but the only type of gasoline carburetor which approaches measurably near this ideal in this respect is the surface carburetor, in which the required air circulates over a very large expanse of gasoline wetted surface in the presence of an adequate available heat supply. A fuel vapor practically free from admixture of entrained liquid can be obtained from one of these vaporizers. The average carburetor of the prevailing float feed spraying type only imperfectly performs the work which it is designed to do. It occupies a position between a liquid fuel injecting device and a vaporizing device of ideal characteristics. The charge which it delivers to the intake piping consists, as a rule, of a rather weak mixture of gasoline vapor and air, in which are carried small drops of gasoline, in a condition very similar to that in which water exists in priming in steam. In the inlet piping this mixture may be modified either by a reduction of the entrained globules of gasoline and a consequent increase in richness of the aeriform portion of the charge, or less probably by a further increase in the proportion of condensed gasoline. In either case, except under very unusually favorable circumstances, some liquid gasoline reaches the cylinders, and is utilized, if at all, as is the fuel supplied by the injection system spoken of above. Its partial evaporation in the cylinder serves to enrich the aeriform portion of the charge furnished by the carburetor. but it is usually only partially volatized, and whatever portion escapes volatilization is lost, and much worse than lost, as cylinder incrustations and an offensive exhaust result from it.

THE ORDINARY CARBURETOR.

The ordinary carburetor itself acts mainly as a proportioning and pulverizing device, and the walls of the combustion space act to quite an extent as a surface carburetor. The intervening piping acts also as a surface carburetor to a greater or less extent. If the mixture passages intervening between the jet of the carburetor be possessed of a sufficiently energetic surface carburetor action to vaporize all the liquid hydrocarbon within them before it leaves them, perfect carburation, so far as the volatilization of the fuel is concerned, will result. It may

become necessary before a solution of the problem of complete vaporization outside the cylinder is arrived at to interpose between the jet carburetor of the accepted type and the inlet ports a vaporizing apparatus, constituting a true surface carburetor, possessing the regular characteristics of large exposed area, somewhat tortuous passages in order to bring all the liquid against these surfaces and a free heat supply to these surfaces.

PREHEATING THE GASOLINE.

A volatile fluid like gasoline, when it escapes in a finely subdivided and in a heated condition from a region of higher to a region of lower pressure, passes very rapidly into vapor, in exactly the same manner as the hot water in a boiler passes into steam when the blow-off is opened, and if gasoline could be furnished the air under these conditions the difficulties of full vaporization would largely be eliminated. The extent to which the gasoline in a regular carburetor can advantageously be heated is, however, extremely limited, for if its temperature is greatly raised vaporization will take place in the passage of the jet, vapor will flow through it instead of liquid, and its capacity for passing fuel will fall to a small value, and only an unworkably weak charge will result. Heating the float chamber by means of a jacket up to the safe limit as defined above materially increases the tendency toward the gasification of the fuel, especially as the gasoline when leaving the jet and entering the float chamber meets with a pressure slightly below atmosphere. The denser the fuel used the higher the temperature of the float chamber may be carried

One can conceive of a carburetor gasoline bowl in which the liquid is kept at a temperature representing enough heat fully to vaporize it at the pressure existing in the spray chamber, into which it is to escape, and under a slight pressure. The jet orifice might be closed by a spring seated ball acting as a check valve, which might be unseated to allow the flow of fuel by a pressure impulse derived from the exhaust or in some equivalent manner.

COMPARISON OF METHODS.

There is very little doubt that the supplying to the liquid fuel directly of sufficient heat to vaporize it is a far preferable method to that of depending upon the absorption of the requisite heat by contact of the fuel with hot surfaces after entering the vaporizing chamber. It has been repeatedly pointed out that preheating of the air for the mixture is a less desirable

method of supplying the necessary heat than that of heating the liquid fuel, for the specific heat of air and its conductivity are low and the heat required for the vaporization of a fuel globule is applied externally to that globule by the warmed air.

In the case of a carburetor having a hot jacket about its vaporizing chamber there is constantly a film of gasoline adhering to and taking its heat of vaporization from the warm walls, which film is constantly being renewed by the breaking against the walls of the globules from the jet. As the liquid laden air in the vaporizing chamber is in violent motion the chances of the liquid particles meeting the warm walls are good, and the vaporizing effect is good, so far as it goes.

#### UNJACKETED FUEL SUPPLY SYSTEMS.

It sometimes seems remarkable how engines run as well as they do, especially during cold weather, from carburetors and inlet pipes which are entirely unjacketed and not even provided with a hot air supply. There are thousands of engines thus running, however, but it is hardly to be expected that they are operating very efficiently. Practically all the heat to vaporize the fuel (outside of the engine itself) is derived from the air. The heat in the entering air and the heat of the outside air entering by conduction through the metal of the vaporizing chamber, the mixture pipe and the manifold, constitute the entire thermal supply, with the exception of the small amount of heat which is conducted by the manifold from the engine. That the call for heat is greater than the available supply is shown by the coldness of the carburctor and its piping. Where no artificial heat supply is provided, and the natural heat of the air is depended upon, it seems strange that thin copper pipes provided externally with metal fins are not used. Such a construction would favor the transference of the heat of the outside air into the contents of the piping. The employment of piping of circular section is unfavorable to the entrance of heat through its walls, either from the outside air or from a jacket, as its wall surface is a minimum as compared with its cross-section. A pipe of flattened section exposes a large wall surface for the entrance of heat and a large internal surface, which will carry an extensive film of liquid fuel, and into contact with which the entrained gasoline will be more likely to come than in the case of a circular sectioned passage.

#### IMPARTING HEAT TO INLET PIPES.

In order to increase the external temperature of the inlet piping, and hence to increase the transfer of heat into the contents thereof, and thereby to augment the surface evaporation, a number of expedients are occasionally employed. The inlet manifolds of a few foreign vehicle engines are cast integrally with their exhaust manifolds, the inlet manifold being within, and therefore jacketed by the exhaust gases. A large heat supply is thus available after

the engine is in action to effect the vaporization of liquid fuel which survives as such up to this portion of the intake system. There would seem to be a possibility of the heat supply being excessive under these circumstances which might lead to a preheating of the charge beyond the point of complete evaporization of the contained fuel, but this danger may be regarded as less than that due to a deficit of heat. The combination of the two manifolds in a single casting calls for rather complicated foundry work, and one would think for special expansion joint provisions. An inlet manifold surrounded with a jacket through which the circulating water flows has been used on a few engines, and should greatly increase the heat supply available for the evaporation of the film of gasoline carried by the walls of the manifold. The same effect is produced by the cored out inlet passages in block motors, which are enveloped by the cylinder jackets, and, in a slight degree, in the case of the siamezed intake passages found in engines with twin cast cylinders.

#### WATER JACKETING INEFFECTIVE AT START.

Heat from the circulating water only becomes available in its fullness after the motor has been run for a length of time sufficient to bring the temperature to the normal operative value. Strictly speaking, the temperature of the jacket water should increase with the instantaneous rate of fuel consumption, and in a way this is automatically brought about; but there is quite a time lag between a sudden call for increased fuel consumption and the rise in jacket water temperature which this brings about

Heat supplied from the exhaust is fully available as soon as the motor begins to run, and the exhaust temperature varies with the rate of fuel consumption without any time lag. between the two. Jacketing with the exhaust has the objection, however, that water, excess lubricating oil and soot carried by the escaping gases are likely to foul and even to clog any small passages which may exist in the system. Exhaust jacketed carburetor bowls have been tried and discarded by a number of makers upon this account.

In the case of one American vehicle motor of the block type the riser or vertical pipe connecting the carburetor to the single intake connection is water jacketed. Such a construction is perhaps better than that in which the application of heat is delayed until the manifold is reached, as the earlier the heat is applied the greater the chance of full evaporation being effected.

#### VAPORIZING TUBE CARBURETOR.

In the vaporizing tube carburetor, which was treated very ably by Chester S. Ricker in the March 31, 1909, number of The Horseless Age, heat is applied to the walls of a vertical tube through which a very much overrich mixture is passing, the jet being located in the lower end of this tube. Heat must be applied under these circumstances much more effectively than if it

were acting upon a mixture containing the full proportion of air. One may imagine the fuel globules closer together, and with less insulating air between them, in this dense mixture than in the case of a mixture containing the full amount of air. The main object is, of course, to transfer heat to the globules and not to the air. More globules per unit of time may be expected to come into contact with the hot walls in the case of a mixture densely loaded with such globules than in one relatively sparsely loaded with them. Applying heat to an overrich mixture like this is approaching nearer to applying heat to the liquid fuel in bulk.

#### HEATER TUBES IN 1ET CHAMBER.

The various methods heretofore described for applying vaporizing heat have all consisted in merely warming the wall of a passage through which the mixture is passing. In an article by Perry Okey on page 589 of Vol. 21 of this journal, is shown a pipe leading from the jet chamber of the carburetor which is full of staggered tubes forming water legs, which are full of warm circulating water, and against which the entrained fuel globules strike in their passage and upon which they evaporate. The warm surface is so much enlarged by this arrangement as to constitute it a distinct improvement over the ordinary jacketed pipe. This article is well worth a careful rereading by all persons interested in the carburation problem, for the vaporization phase of the question could hardly be better set forth than it is there. As Mr. Okey says, the device is a surface vaporizer through which the mixture from a proportioning carburetor passes, and the present writer believes that this device is quite typical of the sort of thing that will have to be generally adopted in practice in this day of fuel of relatively low volatility, of greater care in the matter of fuel economy and when carbonization is a much dreaded evil.

It should be remarked, perhaps, that a device of this kind ought to be so arranged as to prove a most effective "trap" for liquid fuel as well as highly effective as a vaporizer. The prevention of any liquid globules from reaching the cylinders is very important. Surfaces covered with some fabric or other fibrous material entrap liquid globules much more certainly than do smooth metallic surfaces, and fibrous bodies offer an immense amount of surface in proportion to the space they occupy. This fact was taken advantage of in the old forms of surface carburetor. A fabric moistened by a volatile liquid gives off vapor most freely, and will not part with the liquid, as such, unless a very great excess of liquid has been absorbed by it. Wire gauze possesses in a slight degree this property of fibrous bodies.

It would not be strange if fibrous or absorbent materials, arranged upon heated baffling plates, should be used to effect the evaporation of entrained liquid fuels. A device of this kind must not be so con-

tracted as to offer a material throttling effect, and on the other hand it must not be unduly bulky.

#### SURFACE VERSUS TEMPERATURE.

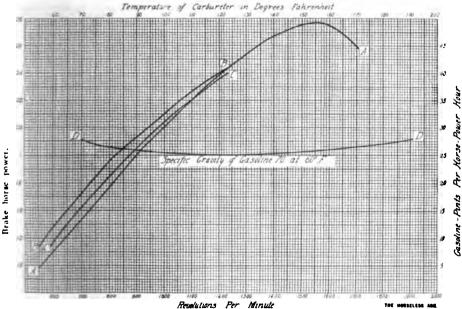
A large amount of evaporating surface in the path of the fuel globules maintained at a very moderate temperature is far preferable to a smaller surface kept at a high temperature. The temperature of the charge entering the cylinders can never rise above the temperature of the heating surfaces, and, in practice, will be very much lower, so that when large, moderately warmed surfaces are used the evaporation even of dense fuels can be effected without serious danger of preheating.

# Some Tests of an Automobile Motor.

The following tests were conducted with a four cycle, four cylinder, water cooled gasoline motor with a bore of 100 mm. and a stroke of 112 mm., with valves on opposite sides, spark plugs located in the caps over the inlet valves, and magneto ignition. The crank shaft revolved in babbitt bearings and the cam shafts in bronze bearings. The upper ends of the connecting rods had hardened steel bushings operating on hardened steel pins. The lower ends had babbitt bearings. The lubrication was by splash, sufficient oil being fed to produce a slightly smoky exhaust. The compression of the motor when cold was 76 pounds. The water jacketed carburetor was fitted with three nozzles, which automatically came into operation successively as the throttle was opened.

The object of the first series of tests was to determine the maximum horse power which the motor would deliver constantly to a Prony brake. The series comprised four tests, extending over one hour each, and the results are shown by curve A, Fig. I, which clearly shows the speed torque characteristics of the motor. This indicates that at 295 r. p. m. the motor delivered 81/2 horse power, and that the power increased rapidly up to 1,000 r. p. m., when there was a slight change in the rate of increase until the speed reached 1,550 r. p. m., when the power began to decrease very rapidly. The rate of decrease in power delivered from 1,550 to 1,710 r. p. m. was more rapid than the rate of increase from 1,350 to 1,550 r. p. m. The temperature of the outgoing cooling water throughout this series of tests averaged 182° Fahr.

The second series of tests were conducted for the purpose of determining the relation between the horse power delivered by the motor at various engine speeds and the temperature of the water in the jackets. The results of these tests are shown by curves B and C. Curve B shows the relation between the speed in revolutions per minute and the brake horse power when the jackets were practically cold, or at a temperature of 79° Fahr. Curve C shows the relation with the temperature of the water jackets at 167° Fahr. It will be noted that with cold jackets 12.8 horse power was delivered at 600 r. p. m., and with warm jackets 11.7 horse power was delivered at the same speed. Likewise at 900 r. p. m. 19.22 horse power was delivered with cold jackets and 18.6 horse power with warm jackets. This shows a slight decrease in the difference of the horse powers at the two speeds. At 1,200 r. p. m. 24.25 horse power was delivered with cold jackets, and 24 horse power with warm jackets; a still greater decrease in the differences. The room temperature throughout this series of tests was 57° Fahr., and the arrangement



A.A. Speed-Norse Power, Maximum Continuous'

B.B. Speed-Horse Power with cold jackets

C.C. Speed Norse-Power with warm jackets

D.D. Gaseline-Consumption-Temperature of Carburetor

FIG. 1.—CHARACTERISTICS OF A GASOLINE MOTOR.

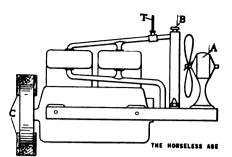


Fig. 2.—Arrangement of Apparatus for Testing Motor.

A, electric fan, the speed of which can be controlled by a rheostat; B, radiator kept at a fixed temperature by the fan; T, thermometer, inserted in water outlet manifold; C, blocks of Prony brake, cooled and lubricated by soapy water.

of the apparatus is shown by Fig. 2. The temperature of the cooling water was kept nearly constant by means of the large electric fan A, which delivered air to the radiator B. The speed of the fan could be varied by means of a rheostat inserted in its circuit, and during the tests with cold jackets cooling was assisted by a small stream of cold water from the city mains, which was fed to the radiator and caused it to overflow continuously. The temperature of 167° Fahr, was decided upon after several tests with cars operating under ordinary road conditions, and may be taken as the average temperature of the cooling water as it leaves the engine under ordinary conditions.

The third series of tests were made to determine the relation between gasoline consumption and the temperature of the carburetor water jacket. The motor was operated at 1,520 r. p. m. and delivered an average of 26.7 horse power for two hours. The result of these tests is shown by curve D. It will be noted that when the temperature of the carburetor jacket was increased from 70° to 120° Fahr. the gasoline consumption decreased very rapidly, and when the temperature was increased above 130° the consumption increased, but not quite as rapidly as it decreased in raising the temperature from 70° to 120°, thus showing that for economy the carburetor under test should be kept at a temperature of from 120° to 140° Fahr.

The Vienna Chamber of Commerce has donated sums of 200 crowns and 100 crowns, respectively, which are to be offered in the form of scholarship prizes in connection with the next course in automobile repair work for Alpine blacksmiths and locksmiths conducted under the auspices of the Austrian Automobile Technical Association in the blacksmith and locksmith shops of the Imperial Trade Promotion Bureau in Vienna. One such course was conducted this year, and proved quite successful. A number of firms in the industry sent some of their foremen to lecture at these courses, and also furnished material for illustrating the lectures.

#### The Garage Business at Seaside Resorts.

By Joseph A. Anglada.

The manager of a garage at a seaside resort is confronted with problems entirely different from those of a garage in a city. In a city there is always some garage business, irrespective of the season of the year; even in winter cars are on storage, and generally there are one or two jobs in the shop. In the spring owners have their cars put in shape for the driving season, and during this season the business generally runs along steadily until cold weather sets in, when most owners put their cars in storage. Occasionally, on a very warm evening, or on a Sunday or holiday afternoon, there may be a sudden increase in the demand for supplies, but the "rush" is generally of such short duration that the regular staff of employees is capable of handling it.

With a seaside garage, however, matters are entirely different. The season begins in May and ends in September, as far as profitable business is concerned, and unless there are a number of resident owners or the garage has a few regular patrons who motor to the seaside on pleasant winter days, it is doubtful whether it pays to keep the garage open for business the year round. In the busy season a seaside garage, as a rule, does very little business in the morning, but from about five in the evening until midnight cars come in large numbers, and owners, as a rule, put their cars under cover, where they will be guarded against theft, in preference to leaving them alongside of the curb at the mercy of the small boy and the mischievous individual. On Saturday cars arrive earlier, especially if the resort boasts a fine bathing beach, and in many cases they leave at an early hour, only to be replaced by large numbers of cars whose occupants spend the evening at the resort. On holidays and Sundays cars begin to arrive as early as 9 a. m., and along about 2 o'clock in the afternoon the influx is at its maximum. This transient trade consists mostly of owners who live from five to twenty miles from the resort and who drive to the coast to enjoy the sea breezes and have dinner before driving home. These owners store their cars regularly in public garages near their homes, and in a few cases in their private garages. They purchase their supplies and accessories from these garages or from regular supply and accessories houses, so that the seaside garage keeper receives but little call for supplies, and practically none for accessories, unless, as previously stated, there are local owners who store their cars at his garage. The rates for owners generally vary from \$20 to \$30 per menth, and include storage, washing and polishing. The rates for transients vary with different localities, but, as a rule, a charge of 25 cents for six hours or any part thereof is made for storage on all days except Saturdays, Sundays and holisimilar period.

#### REPAIR FACILITIES.

The nature of the repairs which a seaside garage is called upon to make does not necessitate an extensive tool equipment, it being found advisable to make arrangements with a good shop in a nearby section where repairs may be sent, and in many instances seaside garages are operated as auxiliary to such shops or to garages in the city. A well equipped emergency car should, however, form part of the equipment of the garage, so that roadside repairs may be made, and, if necessary, the disabled car towed where it can be repaired. The emergency car should be fitted with compartments for carrying a few inner tubes, shoes, blow-out patches, chains, a spare wheel equipment which can be secured to the hub of a broken wheel, spring repair clamps, a set of dry batteries, a single unit spark coil, some high tension and low tension ignition cable, spark plugs of the various sizes, a box of odds and ends, including various sizes of bolts, nuts and pins, a coil of soft iron wire and a few rolls of wide rubber tape for temporarily repairing broken pipes, etc. A complete set of the usual automobile wrenches, screwdrivers, etc., in addition to two good jacks, should also be included in the equipment, as well as a tire pump operated by the motor of the car. A sealed five gallon can of gasoline in a protecting crate, three one gallon cans of engine oil and a small can of grease should also always be on the car.

The shop equipment of such a garage as we are considering should comprise a 16 inch lathe with screw cutting attachment for turning pins, etc, and for straightening bent shafts; a sensitive drill press with various sizes of drills and taps; a small forge and anvil used principally for straightening bent parts, and a complete soldering outfit for repairing radiator leaks,

#### PROTECTION AGAINST STORMS.

The building in which the garage is housed should cost as little as is consistent with good appearance and thorough protection against storms, because on the occasion of a sudden storm the seaside garage finds the protection which it offers its greatest advertisement. The interior should be well lighted by day and night, and, if possible, there should be an entrance at one end and an exit at the opposite end or side of the building. Otherwise, if but a single doorway is possible, it should be wide enough to permit a car to enter while another is coming out. The runway leading to the building should have a gradual slope, and the street in front of the building should be well drained, because a muddy street, such as is often found in front of resort garages, creates a bad impression which certainly does not make the place popular. The floor of the garage should be far enough above the level of the surrounding property to prevent the possibility of water entering in the

days, when the charge is 50 cents for a event of a heavy rain, such as frequently occurs during the summer months. Gasoline should be stored in a tank, buried some distance from the building, and the pump for drawing gasoline from the tank should be located in a small fireproof house, which should be well ventilated.

> In a number of garages of this class. when a car is placed in its charge, the driver is given a numbered cardboard tag, a duplicate of which is secured to the car. which is only surrendered to the possessor of the tag. Others use brass checks, resembling baggage checks, instead of the cardboard tags. At some of the garages which use cardboard tags the time of arrival of the car is stamped upon the tag in order to prevent disputes. This elaboration is, however, hardly necessary considering the short period of storage and the small sums charged.

Italian Imports and Exports.

The Italian Minister of Commerce has just published the statistics of imports and exports during the year 1908, from which we reproduce herewith the figures relating to Italy's foreign automobile trade. The imports of motor trucks, pleasure vehicles and motorcycles during the year were valued at 4,877,522 lire (1 lire is equal to about 20 cents), which represents a reduction of 4,015,013 lire, or 45.2 per cent. from the figures for 1007. The exports of automobiles, on the other hand, attained the very respectable total of 28-683,575 lire, an increase of 8,233,815 lire, or 40.2 per cent. over the figures for 1907. As regards the importation of pleasure vehicles in 1906, 931, valued at 9,957,316 lire. were imported; in 1907, 725, valued at 8,-266,335 lire, and in 1908 only 348, valued at 4,354,492 lire. The movement in the exports has been the exact opposite of that shown by the imports. During 1906 the Italian industry exported 829 pleasure vehicles, valued at 11,847,700 lire; in 1907. 1,283 vehicles, valued at 20,185,310 lire, and in 1908, 1,629 vehicles, valued at 28,-236,745 lire.

The entire increase in exports was in pleasure vehicles. (In fact, only for 428,130 lire Italian trucks were exported, and for 18.700 lire Italian motorcycles.) The French exports to Italy have diminished during the past several years. Thus in 1906 France exported 706 cars to Italy, in 1907 473 and in 1908 only 238. On the other hand. France also buys fewer Italian vehicles every year. Thus in 1906 464 Italian cars were imported into France, in 1907 353. and in 1908 only 275. The bulk of the increase in the Italian exports is taken by England. In 1906 only two Italian cars were imported into the United Kingdom, in 1907 125 and in 1908 388.

The Argentine Republic is said to be the greatest horse using country in the world. and the only country in which there are more horses than people, there being 112 horses to 110 inhabitants.

#### THE HORSELESS AGE

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#### Crude Rubber Prices Soaring Again.

The era of low priced pneumatic tires, which began last September, or somewhat earlier if we include the cut price period, promises to come to an early end, for presumably changes in tire prices will not lag as far behind changes in rubber prices in a rising market as they did in the falling market. The prices of the best grades of crude rubber used in tire manufacture have recently risen to unprecedented figures. This rapid rise is as hard to explain as the preceding sharp decline. These two price movements were certainly not the result of sudden fluctuations in the demand for rubber for automobile tires. While in this country the automobile industry is unusually active this season, depression reigns in the European industries, in England as well as on the Continent, and the aggregate number of cars produced this year will not greatly exceed that of last year and will show only a normal development of the industry. It is, of course, possible that increasing activity in other industries after the world-wide depression has resulted in an increased demand for Para rubber. What seems more likely, however, is that

the rubber producing states have found ways and means of restricting the output. Indeed, the official statistics, published in our last issue, show that actually less rubber was shipped from Para during the fiscal year 1908-09 than during the year 1906-07. The latter year showed a very material increase in the amount of rubber shipped from Para over the previous year, and this sharp increase in production seems to have precipitated the drop in prices of several years ago.

In this connection it must be borne in mind that rubber is a material for which there are no substitutes, and its consumption is not affected to any extent by fluctuations in price. No one will delay the purchase of a motor car or use his car less because rubber tires are temporarily unusually high in price, because the tires constitute only a fraction of the cost of a car. The cost of the crude rubber, moreover, represents only a fraction of the cost of the completed tire, so the price of tires does not vary in the same proportion as the price of rubber. These same conditions, viz., that there are no substitutes for rubber, and that fluctuations in its price do not result in corresponding fluctuations in its consumption, explain why a slight underproduction is immediately followed by a sharp rise in prices and slight overproduction by a similar decline.

As already pointed out, changes in the prices of tires always lag slightly behind changes in the price of crude rubber, for one reason because the big tire manufacturers always contract for a supply of crude rubber at fixed prices in advance, and are, therefore, in position to maintain their old prices for a while after rubber prices have begun to advance. But it is generally understood that the tire prices established after the agreement last fall leave a rather narrow margin of profit, and revised schedules of tire prices may therefore be expected in the near future. It is not unlikely that the manufacturers of solid tires will take the initiative in this revision, as they did two years ago when rubber prices dropped, because the cost of crude rubber is a relatively more important item in solid than in pneumatic tires.

# Legislative and Legal Department of This Paper.

It is unnecessary to state that THE HORSELESS AGE is a technical journal, having for its purpose the dissemination of scientific and other useful information to all who are or may become interested in vehicles propelled by power on the public thoroughfares. The name Horseless Age implies a mechanical era in which there is to be a substitution for animal power, therefore much that is to be found in this publication has to do with mechanical engineering. With truth it may be said that THE HORSELESS AGE is the only American automobile periodical which is strictly a scientific journal. Fiction, stories of automobile picnics and the like are totally irrelevant to this paper. These can be found in other periodicals devoted to the publication of pictures and amusing rather than instructive and educating reading. THE Horseless Age is also something more than a purely technical journal of automobile mechanics. It seeks to cover the whole field of usefulness by briefly recording news of interest to thinking people and by acquainting its readers with important information concerning the use of the mechanically propelled vehicle on the public highways. Therefore, each week we devote considerable space to legislative and legal matter, which, though subordinate to the other subjects usually discussed, is of importance.

Just exactly how much space should be devoted to legal matters depends upon the importance of the subject to Horse-Less Age readers. We want to give the subscribers all they desire, and at the same time we do not want to overburden our readers with reading matter which may seem foreign and possibly dry or uninteresting.

That our legislative and legal department is justified and warranted has seemed beyond question. It is the law which allows the horseless carriage to exist and to be run; it is the law which regulates its locomotion; it is the law which protects and punishes its operator. In fact, very much that is said and done concerning the automobile seems to weave into it legal considerations, so The Horseless Age has, for this reason, sought to give to its readers the best thought on various legal questions involved that could be proceured.

The policy of this paper is and always will be to satisfy its readers; therefore, we would deem it a favor if our subscribers and readers would frankly advise us whether in their estimation too much or too little of any particular subject is to be found in our weekly issues. We want the paper as near perfect as possible, and any suggestions concerning the legislative and

legal or other departments will be greatly appreciated.

#### The Wheel Tax Idea.

A new phase of automobile legislation has recently developed in Maryland. In that State a new automobile law is at present under consideration, and in order that the subject might be handled intelligently the Governor of the State some time ago appointed an automobile commission to investigate the requirements as to auto legislation and to frame a suitable bill. This commission has been in conference with a committee of the A. C. of Maryland, and several points have been agreed upon between the two bodies which have been incorporated in a bill, while in regard to others there is disagreement. The Marvland motorists are willing to submit to a special tax on automobiles on the condition that a wheel tax be imposed on all wheeled vehicles, the receipts from which are to be used for highway improvement.

This standpoint is a new one for motorists to assume. In several of the States the motorists last winter offered to accept a special tax in exchange for concessions in the way of increased speed limits or the total abolition of such limits, but several of the bills drawn on these lines did not become law. The Marylanders are evidently more practical minded. Instead of approaching their Legislature with the proposition: "We are willing to be taxed if you will not interfere with our speeding," they made it: "We will pay for our use of the highways if other users are also required to pay." There can be no question as to the equity of this proposition. The only manner in which a special tax on automobiles can be held to be constitutional is by regarding it as a road tax-a tax for the use of the road. But if automobiles are taxed for using the public roads, it is no more than right that other vehicles should also be taxed therefor, because all sorts of wheeled vehicles have a destructive effect on roads, and conditions are even conceivable where a heavily laden horse drawn vehicle with narrow tires is more destructive to the road than a rubber tired automobile. The imposition of a wheel tax for the purpose of raising funds for road maintenance is a relatively new idea, as heretofore the public roads have been built and maintained with funds raised by general taxation. The wheel tax plan has been subjected to a rather severe as to its constitutionality in Chicago,

from which it emerged unscathed. The plan has one notable advantage, viz., that it permits of placing some restraint on the use of vehicles unusually destructive to the roads.

#### Accessibility of the Gear Box.

Accessible as are the motors of most modern cars it is unfortunately the case that the gear boxes of many cars of standard construction, some of them of the highest grade, are not easily gotten at. With the gear box as an independent unit, its location along the axis of length of the car is susceptible of some variation. The provision of adequate space for the universal joint between it and the clutch acts to determine its forward limit, and the rearward limit is fixed by the necessity of minimizing the obliquity of the propeller shaft.

The type of body which the chassis carries largely determines the accessibility of the gear case. If a touring body is used the gear box is too likely to be found directly under the front seat. As the gasoline tank is generally placed under this seat, the clearance between tank and gear case is likely to be very slight, with the result that it is very difficult to remove the cover of the box and even to reach the plug which permits of supplying lubricant to the gear set.

Inspection of the gears and even the replenishment of their lubricant is often neglected simply on account of the close quarters in which the work has to be done. In some designs in which this fault exists the gear box could seemingly have been placed somewhat further forward without unduly crowding the universal joint connecting the gear set with the clutch and without unfavorably affecting the weight distribution. Or, it could apparently be located a little further to the rear, so as to make it accessible by raising the tonneau floor boards, while not seriously increasing the angle of the drive shaft.

When a runabout or roadster body is applied to such a chassis the front seat is enough further to the rear so that the gear box, or at least the greater part of it, comes under the front floor boards, by the raising of which access to it may be had. If it has to be dismounted it may be necessary to remove the body for the purpose, especially if the gasoline tank is located elsewhere than under the seat, as is sometimes the case in runabouts.

In the unit power plant construction the

gear box, being affixed directly to the engine base, is well forward and accessible by raising the front floor boards. In the case of the rear axle mounted gear box, its accessibility is perhaps not quite so good as that of the unit power plant, but there is plenty of clearance above it and there is really no difficulty in getting at it.

It is well worth the while if designers in laying out chasses with independent gear boxes provide for their location so that they may be clear of the front seats of the vehicles to which they are to appertain. An inaccessible gear box means, in practice, a neglected gear box, and the latter too often means dissatisfaction upon the part of a customer.

# General Motors and Licensed Association.

The acquisition of the control of the Cadillac Company by the General Motors Company is of more interest than any of the other big deals of the latter which have preceded it, not only because the Cadillac Company is the largest concern yet acquired by the "trust," but also because it is the first firm within the "Licensed" Association to join the General Motors Company. Of course, the Buick Motor Company, the nucleus of the "trust," still has a Selden license, we believe, but it is not a member in good standing, having long since ceased to pay its license fees. The Cadillac Company has all along been one of the staunchest supporters of the Licensed Association. The statement was given out that the policies and management of the Cadillac Company would remain unchanged, but in view of the previous attitude of the head of the General Motors Company toward the Licensed Association. it is at least an interesting question what the Cadillac Company's attitude toward the Licensed Association will be under the new régime.

#### Vienna Motor Cab Failure.

The Vienna Motor Cab Company, Ltd., which was organized about a year ago by a French automobile house, with 92,000 crowns capital stock, with the object of introducing motor cabs in Vienna, has wound up business. The firm opened negotiations with several Vienna cab companies for the purchase of licenses. As a matter of fact it acquired only a single license, and it would seem from the failure of the enterprise that the substitution of the motor for the horse in Vienna involves great difficulties.

# Maintenance and Repairs



#### What Experience Teaches.

By "OWNER."

It is probably just as well that owners and chauffeurs of new cars do not know too much about them, because, as a rule, all a new car needs for the first season is plenty of oil in the right places in addition to its gasoline and ignition supples. But the second and subsequent years of a car's life are the critical times when experience is absolutely necessary to keep the car from deteriorating in value and usefulness. Nevertheless, despite years of experience, things will happen and a driver will ignore them until sometimes considerable damage is done.

The writer was driving his car one day when he heard a sharp crack, and was about to stop. One of the passengers said we had passed over a piece of wood which had broken with a snap; looking back we saw the piece of wood in the road, so we went on, assured that nothing was wrong. In a few miles another sharp crack was heard, and the passenger said we had passed over another piece of wood, but we stopped the car and got out and walked around and peered here and there, but found nothing wrong, and on walking back a short distance picked up a piece of the top of a soap box which had been split lengthwise in several pieces. It was reasonable to suppose that this had produced the noise when the car had passed over it, so we jumped in and went off again, free from care. The car ran splendidly for perhaps 30 miles, and we were but a few miles from home, going fast to get there in time for dinner, when again came the same sharp, distinct snap. The car was instantly stopped, because now we knew there was something wrong, and we could not be lulled again into a fancied security until that sharp snap was clearly and satisfactorily explained. It did not take long to find that three leaves of the right front spring were snapped clear through, and that nothing held the front axle from steering around, and perhaps ditching the car, but two small bottom leaves and the spring clips, which latter were loose and were fast working apart.

There might have been a dangerous accident because of our stupidity in not finding the cause of the first sharp snap, and we could have saved the price of a complete new spring if we had been cautious. It startled us somewhat when we found that nearly all the spring clips were so loose that you could turn some of the nuts with your fingers.

UNUSUAL NOISES WARNING SIGNALS.

Any unusual noice should cause the inver to stop instantly, and he should find

out the cause, if possible, and if no apparent cause can be found a thorough examination of the springs and the steering gear should be made before going on. Thereafter cautious driving should be the rule, until a complete examination can be given the car at home. Of course, no car should be driven a foot if there is a continued unusual loud noise, and even unusual clickings should be examined into, or great damage may result.

THE HORSELESS AGE.

Regardless of the continued expressions of supreme confidence that are heard from many drivers, the new owner should exercise at least as much care in driving a car as he would in driving a horse, and no man would dare to continue to drive a horse at speed if he considered for a moment that the carriage running gear was not in perfect order or that the harness was worn out; and yet the danger from weakness in a motor car is far greater than the danger existing in the case of a horse or carriage.

The person who continually warns his motor owning friends of the dangers attendant upon driving a car is somewhat of a bore. Nevertheless, the man who examines the vital parts of his car carefully before going out usually returns safe and sound, and surely the fact that such a driver feels confident in the knowledge that his car is solid and free from apparent defect in these vital parts cannot detract from the pleasure of a day's run.

#### STEERING GEAR MOST IMPORTANT.

Steering gear parts rank first in the catechism of safety; next come the brakes, then follow the springs. If these are strong there is comparatively no danger to life or limb. Defects in engine, transmission, body and accessories result in annoyance and delay, which are bad enough, but if taken philosophically and with patience, as they should be taken, they do not materially harm anything but the pocket.

The steering gear is of such vital importance that no car should be taken on the road for even the shortest distance unless all parts of the gear are in perfect order. Play in the steering wheel, of course, is not considered a great defect, as nearly all cars sooner or later develop this, but this is the only defect that should be tolerated.

The car may be driven at a slow pace even if the brakes are defective, provided no hills are to be encountered and the journey does not run through a crowded city. But no hill worthy of the name should be attempted, up or down, unless at least one set of brakes may be depended on. Of course, the engine can be used as a brake under certain circumstances and in experienced hands, but I have found that unless the low gear, or at least the second gear, is used, the engine is not much use on a steep hill. Going down a hill the use of the engine will check the speed, but you need the best of brakes in the best order to stop in an emergency.

CLUTCH AND BRAKE INTERCONNECTION.

In this regard it might be well to say that the coupling of the foot brake and clutch is not, in the writer's opinion, a desirable feature on a car, as it compels reliance to be placed solely on the engine as a check on the speed in descending hills or solely on the brakes. Experience has shown when taking a steep hill with the first speed engaged that the foot brake could be used to great advantage to help check the speed if it were disconnected from the clutch.

Where the clutch and brakes are connected and the engine is being used as a brake, it takes an appreciable space of time to take out the clutch and apply the brake, unless the emergency brake or foot brake is jammed on with great force. It will be found that on a steep grade the car will jump ahead with great speed while such a change is being made, a condition of affairs which is liable to shake the nerves of anyone but a reckless individual, and a driver needs his nerve when he is descending a long, steep hill with a loaded, heavy car.

On ascending a hill a separate foot brake disconnected from the clutch is invaluable in cases where gears are missed in changing down. This, of course, results, as a rule, in a stop, and an application of the brakes to hold the car until first speed is engaged. Unless the brake can be used alone it requires very delicate work to release the brake and apply the clutch. If you release the brake and do not apply the clutch quickly the car will start backward, which will involve the quick application of foot and emergency brakes. If, on the other hand, you release the brake and let in the clutch too quickly you are very likely to stall the engine.

The writer had an entertaining experience on a very steep, winding hill driving a car with clutch and brakes interconnected. Rushing the hill on the fourth speed we were forced quickly to third, second and then to first on the steepest part, about three-quarters of the way up, where the road made a sharp turn. The engine was gallantly pulling away, hoisting the car up the heavy, sandy road at about 4 miles an hour, when an ominous crack was heard under the footboard; the engine raced like a dynamo and the car gathered stern way down the winding, twisting hill. On went both brakes instantly and the car brought up solid.

#### BRAKE LEVER INSECURELY LOCKED.

As the catches on the brake lever were somewhat worn and the lever was liable to release itself when put on hard, the driver was afraid to leave his seat until the car was secure from backing down the hill. As the passengers were all women no aid could be expected from that quarter, so they were asked to alight and take a walk to view the scenery. No stone large enough to block the wheels being in view, the car was backed down slowly into

the ditch so that it was secure from any movement. Examination of the car showed everything in good order, so far as could be seen. The engine turned over, the clutch shaft ran freely with the gear in neutral and held firmly when in first speed. So, deciding to put the car to the only proper test, the engine was started and the first gear put in, and the car pulled out of the ditch in good shape. Taking the passengers aboard we retraced our way down the hill, and the car performed properly on all speeds. It was not until some weeks afterward that the cause of the ominous crack was discovered. On taking the same hill on first speed the change speed lever jumped out of the notch with the same sharp crack that we had previously heard and the car stopped as before. The journey up the hill was continued with the lever kept in place by the hand without further trouble.

It is unnecessary to say that both emergency brake lever and change speed lever were put right immediately on finding out these defects.

#### Scottish Reliability Trial Awards.

A complete report of the above trials appeared in our issues of June 30 and July 7. The awards have now been announced by the judges. Efficiency gold medals in each class have been awarded as follows:

ionową.	Marks.
Class A-10 h. p. Riley	989.9
Class B-12-18 h. p. Riley	976.9
Class C-10-12 h. p. Humber	995.9
Class D-14-16 h. p. Argyll	985.9
Class E-16 h. p. Humber	994.9
Class F-24 h. p. Vauxhall	995.1
Class G-30 h. p. Adler	976.6
The season and the secondary in an	-4

The total possible of marks in each case is 1,000.

In each of Classes D and E, in consid-

In Class H there was only one competitor who completed the trial, and the committee, on account of the number of marks lost for repair of detachable wheels, have not seen their way to award a medal in this class.

Bronze medals, awarded in each class to the car gaining the highest number of marks for hill climbing, have been awarded as follows:

as ronows.	viarks.
Class A-10 h. p. Riley	50
Class B-12-18 h. p. Riley	50
Class C-12 h. p. Star	
Class D-15 h. p. Star	49.1
Class E-16 h, p. Humber	47 - 7
Class F-24 h. p. Vauxhall	47 - 1
Class G-38 h. p. Minerva	50
Class H-50 h. p. Ariel (only competitor).	

Total marks possible 50.

The Scottish Cup for the vehicle showing the lowest fuel consumption per ton-mile over the whole trial has been gained by the 38 horse power Minerva, with a consumption of .02244 gallon per ton-mile, equal to 44.57 ton-miles per gallon of fuel.

# Injector Carburetors for Heavy Fuel.

(Paper read by F. Duerr before the Automobile Technical Association at Frankfort-on-Main.)

The lighter grades of gasoline, of 0.680-0.700 specific gravity, have ceased to be regarded as the only fuels for automobile motors. The frequent variations in price of this fuel and the sometimes exceptionally high price have been the causes which led to a search for other, cheaper fuels. A considerable number of manufacturers have endeavored to perfect suitable apparatuses which would

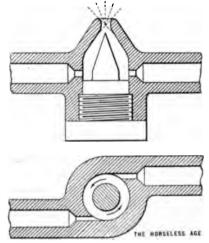


Fig 1.

make it possible to use these cheaper but heavier fuels.

Of these fuels benzol deserves to be mentioned in first place, and its use is constantly increasing. There are some exceptionally volatile grades of benzol which may be vaporized as readily as the lighter grades of gasoline. That a large proportion of the carburetors so far used are not immediately applicable to the use of benzol is due to the chemical properties of this fuel. Benzol contains a much greater proportion of carbon and a much smaller proportion of hydrogen than gasoline. The processes of combustion of these two elements are different. On combustion both form carbonic acid and water. But as one atom of carbon requires two atoms of oxygen for its combustion into carbonic acid (CO2) and one atom of hydrogen only one-half atom of oxygen to form water (H2O), it follows that hydrogen requires only one-fourth as much oxygen for its combustion as does carbon. Consequently, if a fuel contains much hydrogen it requires little oxygen, and if it contains much carbon it requires much oxygen for its combustion. In practice the oxygen required for combustion can be supplied to the cylinder only in the form of atmospheric air, and it follows from this that a benzol carburetor must have a much greater amount of air supplied to it than a gasoline carburetor. Most of the older carburetors would not operate on benzol because, although the air received by them was sufficient for operation on gasoline, it was insufficient for operation on benzol.

From the time that benzol began to compete with gasoline, the problem presented itself of designing a carburetor which would work equally well with either fuel, and this problem may now be regarded as solved.

The fact that benzol is constantly being more extensively used, owing to its low price, has led a number of gasoline distillers to determine whether it is not possible to use a heavier grade of gasoline than that commonly employed, which varies between the limits of 0.680 and 0.720 specific gravity. It was, of course, to be foreseen that satisfactory results could be obtained if the carburetor were pre-heated or the motor started with a lighter grade of gasoline. The question, however, came up whether it was not possible to start the motor cold with such heavier gasoline. It may here be remarked that whenever the term "heavy gasoline" is used in this article a distillate of more than 0.750 specific gravity is referred to. The heavier grades of gasoline vary with respect to volatility according to their origin, some of them being quite readily vaporized, and others, again, being entirely impossible to vaporize without the application of heat. The purchaser who knows only the specific gravity of the fuel has no means of telling whether the fuel may be vaporized easily or only with difficulty. Only carburetors should therefore be used which will handle the least volatile fuel without trouble.

After vaporization had been disposed of there was only one possible solution of the problem, and that consists in dividing the fuel mechanically into very fine particles so that it is, in a sense, separated into its molecules, and every one of the molecules is surrounded by sufficient air so that complete combustion is possible. Now, we possess a whole

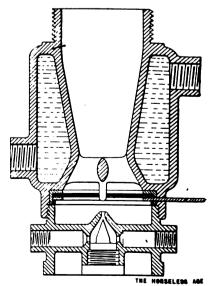
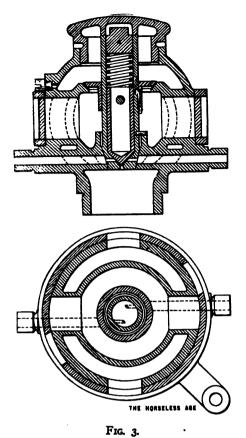


FIG. 2.



series of apparatuses for finely spraying fluids. Practice, however, has shown that these spraying devices do not divide the gasoline into sufficiently fine particles, and a pointer as to how this exceedingly fine division of the fuel may be most rationally effected has been obtained from the Diesel motor. The purpose is accomplished by making use of air for spraying the fuel. Another requirement is that the spraying may be effected without special resistances. It is obvious that the fuel will be sprayed the finer the greater the difference in pressure between the space into which the sprayed fuel enters and the space from which the fuel and air arrive. That is to say, if we provide an arrangement which makes it possible to supply the fuel and the spraying air to the spraying nozzle under pressure, we will secure a very fine division, the fuel particles will be smaller, and will therefore be easier to surround each particle with a sufficient amount of air to effect its complete combustion; the thermal efficiency will be increased and the operating cost decreased.

The simplest method of effecting this spraying of the fuel consists in imparting a rotary motion to a fine jet of fuel and a fine jet of air, and after they have attained a certain velocity, forcing them to escape through a common spray opening. The accompanying sketch shows such a spraying arrangement. The horizontal cross section, Fig. 1, shows two channels opening tangentially into a conical space. As already pointed out,

the fuel enters from one side and the air from the other. During the suction stroke of the motor a partial vacuum is created in the conical space c, Fig. 1, the fuel and air enter with considerable velocity into this space and move helically along the periphery of the conical space, toward the spray opening d, as is indicated in the vertical section. The lighter air escapes at a higher velocity, overtaking the fuel, thereby constantly detaching small particles of the latter. At the spray nozzle opening the escaping mixture of air and fuel forms a coneshaped body of mist, which greatly facilitates the mixing of the two elements.

The application of this spray nozzle in a carburetor is illustrated in Fig. 2. The spray nozzle is located in the lower part of the carburetor, and directly above it there is an iris shaped valve designed to permit of regulating the opening, which is capable of rotating around a stem If the iris is fully opened the fuel, mixed with additional atmospheric air, will flow through the carburetor, whose mixing chamber can be suitably heated by means of exhaust gases or circulating water.

It is, of course, also possible to develop the injector nozzle so as to operate mechanically, and the writer considers the mechanical injection the most appropriate method of fuel supply, which, moreover, has long since been adopted on stationary motors. Another design of carburetor in which the admission of fuel is controlled automatically by the suction of the piston is shown in Fig. 3.

## Southern California Club's New Ouarters.

The A. C. of Southern California has rented the ground floor of the building at 323 S. Hill street, Los Angeles, where headquarters will be established. During the first five months of the year the club's membership was doubled. Ito new names being added to the membership rolls during June. The club is carrying on an active campaign for the erection of signboards throughout the southern part of California and has obtained appropriations equal to its own contributions from several boards of county supervisors. The club is establishing branches in all the counties of its jurisdiction, consuls taking charge of the local work in conjunction with the directors of the general organization.

# Monarch Motor Car Company Bankrupt.

The Monarch Motor Car Company, of Chicago Heights, Ill., was thrown into involuntary bankruptcy on July 9, with liabilities estimated at \$50,000 and assets of half that amount. David Davis, of New York, was one of the pétitioning creditors. Preferential payments are alleged to have been made. The American Trust and Savings Bank was appointed receiver.

# The Historical Development of the / Truffault-Hartford Shock Absorber.

A circular recently issued by the Hartford Shock Absorber Company gives an interesting historical résumé of the introduction of shock absorbers in this country by Edward V. Hartford, and the development of the device up to the present time. The circular is herewith condensed.

In the fall of 1897 Mr. Hartford went to live in Paris, and in the fall of the following year he was delegated by the Marquis De Dion, one of the founders of the French automobile industry, to try to establish a branch of the De Dion-Bouton automobile business in the United States, raising the necessary capital here. Mr. Hartford states that his mission failed entirely, as American investors at that time were not willing to venture any money in automobile enterprises.

In the spring of 1899 Mr. Hartford attended a 100 kilometre motor tricycle race at Versailles. More interest was being taken in tricycles in France at that time than in automobiles, for the reason that the former were faster. The race was won by Marcellin on a Darracq tricycle equipped with a 12 horse power, two cylinder Buchet motor, who defeated Baras, who up to that time had been regarded as the champion tricycle racer of France. Both Marcellin and Baras rode tricycles of the same make and horse power, but Marcellin's machine was fitted with a special front fork, known as the Truffault fork, and his victory was ascribed by himself and by Baras to the use of this device.

Mr. Hartford was much impressed with what he had seen, and the next day looked up M. Truffault, whom he found working in a little shop near the Porte Maillot, in Paris, assisted by his two sons. Truffault was a man about sixty years of age and a typical inventor. Mr. Hartford had the Truffault fork applied to his own 21/4 horse power De Dion tricycle with very gratifying results. He and Truffault became friends and worked together on the shock absorber problem, adapting these devices to automobiles. The present three point suspension is claimed by Mr. Hartford as one of his ideas. Mr. Hartford came back to America in the fall of 1900, and sent a 6 horse power Oldsmobile over to Truffault to experiment with. This was the first car ever fitted with a complete set of shock absorbers, all previous experiments having been made with tricycles. The idea of applying a friction brake to the springs was ridiculed by many automobile engineers at the time. and it was even suggested that instead of retarding the action of the springs by friction they should be fitted with ball bearings so they would act as freely

Mr. Hartford shortly after his return to America met a representative of a large automobile manufacturer and began negotiations with him regarding the manufacture of the shock absorbers in this country. In order to help matters along he had M. Truffault come over from France and stay at the factory of the manufacturer referred to for two weeks. fitting the car turned out there with lighter springs all around and applying shock absorbers. When the car had been equipped it was subjected to a most searching test, at the conclusion of which the manufacturer made an offer of \$1,000 for the Truffault patent. As this was little more than had been expended in making the demonstration, including the trip of Trauffault from France and back, the offer was declined.

Truffault upon his return to France entered into a contract with the Peugeot firm, by which the latter was to have the exclusive use of his patent in France. Peugeot at once fitted all his own cars with shock absorbers, and also supplied a few sets to other manufacturers. It was after the victory of Thery on a Richard-Brasier racer in the Gordon Bennett race in June, 1904. that shock absorbers became extremely popular. There drove one of the lowest powered cars in the race, and his success was ascribed largely to the fact that owing to the use of shock absorbers his wheels kept the road, and thus the power was economized, and the tires and the whole mechanism of the car were saved. From that time on shock absorbers have been invariably fitted to all racing cars, and also to a majority of big touring cars.

In this country the shock absorber business was started by Mr. Hartford in 1903. An initial order for twenty-five sets was placed with the Garvin Machine Company, of New York, and after this had been duplicated twice a small shop was opened on Hudson street in October, 1903. In May of the following year the demand had become so great that it was necessary to work day and night. Mr. Hartford states that they are now manufacturing 50,000 shock absorbers a year, and he claims that they have always done at least 90 per cent. of the shock absorber business in this country. The success of the device was well illustrated by the numerous imitations which flooded the market at one time, many of which disappeared again soon, however. Mr. Hartford states that they have endeavored to turn out an article of the best materials which should give no trouble to users, and asserts that their shock absorber is the only one adopted by car manufacturers as regular equipment.

The Royal A. C. of Great Britain and Ireland is planning to hold a trial of tire protectors over a distance of 4,000 miles, 3,000 of which is to be on roads and 1,000 on the cemented Brooklands track.

Good Roads Convention Dates Set.

At a meeting held in Cleveland last week

At a meeting held in Cleveland last week the dates for the second annual good roads convention to be held in Cleveland were set for September 21-23. The United States Government has named as its official representative Logan Waller Page, direcor of the United States Office of Public Roads. Co-operating also with the A. A. A. will be the National Grange, the American Road Makers' Association and all of the automobile organizations representing the various manufacturing interests.

Governor Harmon of Ohio has consented to represent his State at this convention, and he will speak on the "Good Roads in Ohio." Mayor Tom L. Johnson of Cleveland will deliver the address of welcome. Congressman R. P. Hobson of Alabama will deliver an address on "National Aid and Post Roads." Among the other speakers selected for the tentative program, with their subjects, are:

"The National Grange and Good Roads," N. J. Bachelder, master of the National Grange.

"State Aid," James H. McDonald, State Highway Commissioner of Connecticut.

"Economics of Road Building," Samuel E. Hill, president National Good Roads Association.

"Road Situation in the United States as Compared with Foreign Countries," Logan Waller Page, director United States Office of Public Roads.

"Macadam Roads," A. B. Fletcher, secretary Massachusetts Highway Commission, or some other speaker to be selected by the Massachusetts Highway Commission.

"Bituminous Road Materials," Provost Hubbard, chemist of the United States Office of Public Roads.

The closing day of the convention will be devoted to a series of tests on macadam roads, to study methods of abating the dust nuisance, and there will also be practical demonstrations with different materials of road building conducted by Director Logan Waller Page. The Cleveland A. C. will take the delegates on a tour of inspection over the improved roads in the vicinity of Cleveland.

#### Los Angeles on Speeders' Trail.

As a result of two fatal and half a dozen other accidents resulting in permanent injuries to pedestrians within the last three months, the city officials and the press of Los Angeles are co-operating in an effort to stop the speed fiends by drastic measures. Three menths ago a labor union leader was struck and instantly killed by a joy rider. On Saturday, July 3, I. Lowman, a well-to-do merchant, was shockingly maimed and instantly killed when he endeavored to cross the street in front of two automobiles engaged in an impromptu race, stepping directly in front of a third machine he had been unable to see. M. C. Abrams. the driver of the machine, employed by a firm of accessory dealers, was arrested

and charged with manslaughter. Twentyfour hours after the tragedy another automobile at racing speed struck a pedestrian, threw him twenty feet and left him unconscious on the curb. The driver did not stop but was arrested after a race of five miles with police officers who impressed a passing motor car. A week before these occurrences a driver, found guilty of having run over a pedestrian and continuing on his way laughing loudly, was fined \$300 and sent to the workhouse for thirty days. His victim appeared in court on crutches, having lost the right leg above the knee as a result of the accident. Hundreds of complaints have been received by the authorities concerning the recklessness of joy riders and public sentiment is deeply aroused

Mayor Alexander, in a message to the city council, recommended the passage of an ordinance reducing the speed limit outside the business district from 20 to 15 miles an hour, raising the minimum fine for the first violation to \$25, for the second offense to \$100 and for the third infraction he favored the imposition of a straight jail sentence of not less than thirty days. Several councilmen declared themselves in favor of reducing the speed limit throughout the city still further, but, as a result of the efforts of the A. C. of Southern California and the newly organized Motorists' Protective Association, calmer counsel prevailed. A committee comprising several councilmen and representatives of the motorists' associations, together with the chief of police, was appointed to frame a new ordinance for submission to the council, and in all probability this ordinance, while not disturbing the present speed limits, will provide for the licensing of drivers and contain a provision for a compulsory jail sentence for reckless offenders. That a jail sentence clause is needed, both for the protection of the public and of the vast majority of law abiding autoists, is shown by the steadily increasing number of accidents-104 in the first five months of 1008. 142 for the same period of 1909-and by the enormous number of fines imposed as a result of the work of but two motorcycle officers mounted on slow machines. The automobile men offered to provide 200 representative citizens and motor car owners, to serve as special officers in running down reckless drivers.

#### Tendered Bad Check for Car.

Joseph W. Smith, twenty years old, was arrested at Indianapolis a few days ago after he had tendered a check for \$2,800 to an automobile concern for a touring car. He represented that he had been left considerable money and he made a good impression on the company. He purchased the car after the banks had closed at noon on Saturday, saying he would call the following day for the car. However, the company found the check was bad and Smith was arrested when he called for the car.

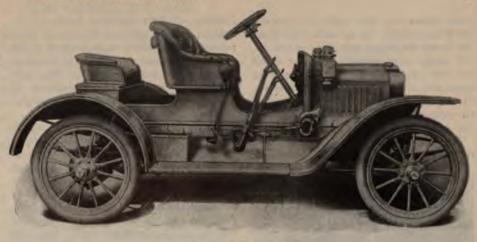
### **NEW VEHICLES AND PARTS**

#### New Maxwell Small, Four Cylinder Car, Model O.

Right in line with the latest development in the automobile industry the Maxwell-Briscoe Motor Company, of Tarrytown, N. Y., last week announced a new four cylinder, 22 horse power runabout, selling at \$850. The same car is furnished with a single rumble seat for \$875 and with a double rumble seat for \$900. Two characteristic features of the car are a three speed sliding pinion change gear and a high tension magneto with dry battery auxiliary. The unit power plant construction characteristic of all Maxwell cars is also found in this new model. Deliveries of the new model, which is made at the Providence plant, will begin this month.

The motor is of the four cylinder, vertical type, of 334 inch cylinder bore by 4 inch piston stroke. The cylinders are cast in pairs. The motor is claimed to develop 22 actual horse power at the normal speed of 900 r. p. m. The water jackets are cast integral with the cylinders, and the valves, located on opposite sides, are interchangeable and exceptionally large. Both inlet and exhaust valves are mechanically operated. The tappet rods are hardened and ground, and their guides are of phosphor bronze. The cams are hardened and ground and enclosed within the crank case, and are lubricated by splash. Three large bearings are provided for the cam shaft, the shaft itself being hardened and ground. The crank shaft is a drop forging, finished by grinding. The connecting rods are steel drop forgings with bearings of compressed babbitt. The connecting rods may be reached through hand holes on each side of the crank case provided with cover plates which are quickly removable. The motor is very similar to the Maxwell Model D. A. 30 horse power.

The sliding pinion change gear gives three speeds forward and one reverse, direct drive being on third speed. Roller bearings are used throughout. The gears



MAXWELL MODEL O.

are drop forged, carefully cut and hardened. A feature of this transmission is the positive gear lock which prevents the shifting of gears when the clutch is engaged.

The Maxwell-Briscoe Company makes the claim that the first multiple disc clutch for use on an automobile, either in this



MULTIPLE DISC CLUTCH.

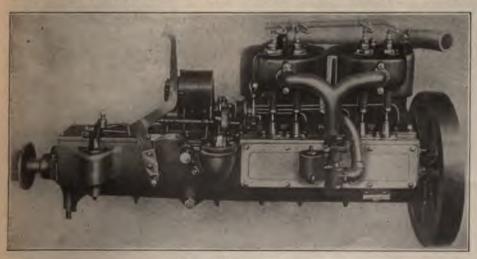
country or abroad, was used on the first experimental Maxwell model built at the end of 1903. The new model is fitted with an all-metal multiple disc clutch, consisting of fifteen saw steel discs, each disc being concave about 1-32d of an inch, a construction which causes the clutch to engage gradually. The steel discs run continually in a bath of oil, which practically eliminates wear and permits of the slipping of the clutch without injury to the plates. The thrust from the clutch spring is taken up by a large ball thrust bearing.

The carburetor is of the constant level float-feed type and is of the company's own design. A needle valve adjustment regulates the amount of gasoline, and a simple adjustment at the top of the carburetor the amount of air. The thermosiphon cooling system has been retained in practically the same form as used on the 30 horse power, four cylinder model.

The oil is carried in a tank located under the hood, from where it is forced through a single sight feed located on the dash, whence it is distributed to each cylinder and to the clutch department. A glass gauge on the oil tank shows through at the dash, so that the operator can at all times see the amount of oil contained in his tank. A positive oiling device supplies oil to each cylinder. This consists of an oil ring fitted at the bottom of each cylinder. This ring is constantly supplied with oil by the mechanical oiler and into it the lower end of the piston dips at each stroke, carrying with it enough oil to copiously lubricate the cylinder. This device is claimed to prevent the flooding of the cylinders with oil and to eliminate the tendency to carbonize.

The drive is by a propeller shaft fitted with two self oiling universal joints. The rear axle is of the bevel gear type and the gears are drop forgings, carefully cut and hardened. Both the main drive gear and the pinion are exceptionally large. The shaft of the driving pinion is carried in two roller bearings. These bearings are lubricated by a large self feeding grease cup. The second feature in connection with this rear axle is a special thrust roller, hardened and ground, and fitted against the main bevel gear. This device holds the main drive gear firmly against the pinion.

Two sets of brakes, of the internal expanding and external contracting type respectively, are mounted on the rear hubs. The internal brake shoes are of cast iron, expanding against a steel drum. The ex-



Model Q Power Unit.

ternal shoes are lined with an asbestos lining and contract on the same steel drum. The brake dimensions are 1½x9 inches.

A single lever controls both the clutch and the external brake. The emergency brake also automatically releases the clutch. The spark and throttle levers are located on opposite sides and immediately under the steering wheel.

The frame is of pressed steel and hotriveted throughout. The front springs are



SELF LUBRICATING UNIVERSAL JOINT.

32x134 inches, and the rear springs 36x134 inches. Strut rods are placed between the rear axle and the frame so as to take the driving effort off the rear springs. The wheels are of the artillery pattern and of selected second growth hickory. The tires are 30x3½ inches, of the standard clincher type. The wheel base is 93 inches and the tread 56 inches.

Thorough protection to the engine and transmission from mud and dust is afforded by a pan extending from the radiator to the rear end of the gear box. Metal extensions are also provided from the frame to the running board and from the frame to the fenders, so that the car can be driven through deep mud without splashing the body, or the passengers. The body is made of sheet steel with moldings. The upholstery is of leather and curled hair. All cars will come ironed for top.

#### Almond Flexible Metallic Tubing.

Flexible, all metal tubing, composed of specially wound spirals of steel wire, is now upon the market and is coming into quite extensive use for automobile purposes. Although no rubber or other nonmetallic packing is used in its manufacture it is claimed to be perfectly liquid and gas tight. It will not kink, but is very flexible. and it is claimed that repeated bending does not cause it to leak. The one-half inch size will bend into a circle of 8 inches diameter without damage, and the smaller sizes will withstand proportionately greater flexures, the curves in which it arranges itself, when in use, being very easy and gradual.

Wherever it is desired to convey oil, grease or gas this tubing may be used, and all elbows or other fittings, save the end connections, may be done away with, no matter how irregular the path taken by the tube may be. The labor of making the usual pipe connections and the

liability of their working loose by vibration may be obviated by its use. This tubing is not furnished in lengths to be cut up by the user, but can be obtained in any specified length up to 10 feet, with the fittings on each end as specified. It is not recommended for water connections.

Wherever oil leads of copper tubing are found to be liable to breakage from vibration this tubing should be applicable with advantage, and its somewhat high cost warranted. It is being used to quite an extent for oil or grease leads to inaccessible parts of the car mechanism, the ends of which may be brought out to handy positions upon the side frame members or elsewhere for the ready attachment of an oil or grease gun.

The hot air collecting device for the carburetor is frequently located upon the opposite side of the motor from the carburetor itself, and somewhat devious piping is required to effect the connection. For this purpose this tubing has been somewhat used, eliminating all angles in the connection, and thus reducing gaseous friction. On motorcycles, where vibration is very intense and pipe fittings frequently work loose, this tubing is recommended for intake and exhaust connections. Indeed, flexible tubing of this kind has been used for the exhaust connections of some automobile motors. Its employment obviates all abrupt turns in the path of the exhaust gases and tends to reduce back pressure as well as the noise which arises from abrupt changes in direction of the exhaust flow. The internal surface of this tubing is naturally not quite so smooth as that of regular pipe, which quality may somewhat counteract the good results of the easy curves in which the pipe arranges itself.

Tubing of this kind is manufactured by the T. R. Almond Manufacturing Company, Ashburnham, Mass., in various sizes.

#### Novel Stocking Cutter.

The accompanying cut shows a new stocking cutter recently designed by the Brown & Sharpe Manufacturing Company, of Providence, R. I. This cutter shows a departure from the general design of stocking cutters in that it embodies in its construction a new principle. Each alternate tooth is stepped. The particular cutter shown is 13 inches in diameter and of 1 inch diametral pitch, which is an unusually large gear cutter. A cutter of this design cuts easier and at faster feeds and speeds than the ordinary stocking cutter, because every other tooth is stepped, tending to break up the chips, which relieves to a large degree the stress on the cutter. It is also a distinct improvement over step stocking cutters which have all teeth stepped, in that they take a cut the shape of the cutter itself, while this cutter cuts more nearly to the exact shape of the tooth space, leaving little stock for removal by the finishing cutter, just enough in fact to insure the accuracy of the gear teeth.

The design of this cutter is exceptionally strong, and the cutter is able to easily take heavy cuts without undue strain on the teeth or driving clutches.

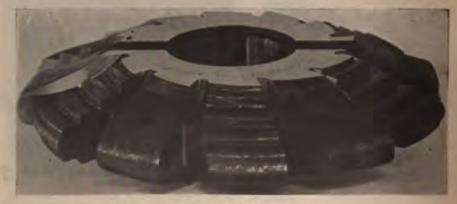
#### Lane Steamers for 1910.

The Lane Motor Vehicle Company, of Poughkeepsie, N. Y., will offer four models the coming season, including a runabout, a five passenger touring car, a seven passenger touring car and a close coupled vehicle. These are built on two chasses of 20 and 30 horse power respectively. The 20 horse power is fitted in runabout and five passenger bodies, and the 30 horse power with close coupled and seven passenger bodies The general design of these cars remains the same as last year, but a substantial reduction has been made in the prices. The runabout will be known as Model 19 and will sell for \$1,250. The five passenger car will be known as Model 20 and will sell for \$1,500. The close coupled car will be known as Model 21 and will sell for \$2,400. The seven passenger car will be known as Model 22 and will sell for \$2,500. All cars will have aluminum bodies and fenders,

#### Cartridge Coil Company's New Switch.

The Cartridge Coil Compary, of Lafayette, Ind., have recently put a new switch on the market which is well made and embodies a feature designed to appeal to the makers and users of cars equipped with two ignition batteries.

The switch enables the operator of the



NOVEL FORM OF B. & S. GEAR CUTTER.



"Switch WITH A MEMORY."

tell which battery was furnishing to the last time the motor was run, or this reason the manufacturers call the switch with a memory." The also reverses the direction of curhrough the coil, thereby preventing cation of the core of the coil, and also ng the pitting of the vibrating points, invariably occurs when the current is flows in the same direction.

switch is enclosed in a circular brass with either satin finish or enameled. The removable key furnished for ing the switch has a hard rubber and is so designed that it cannot be duplicated. The construction of the prevents a nail or piece of wire used in lieu of the key, so that when

#### Ioltzer-Cabot Portable Electric Drill.

y is removed the switch is locked.

Holtzer-Cabot Electric Company, of line, Mass., are marketing two types etric bench drills, one of which is



HOLTZER-CABOT DRILL

th illustrated. This drill is designas Type U. D., when wound for diarrent, and Type U. A., when wound ternating current. The motor is of with horse power, and is contained in reular iron base. An extension of mature shaft projects through the sost, which is located on top of the and drives the spindle by means of a belt, which is tightened by an idler the width of the two speed grooves shown. The current consumption running free is one-half an ampere; driving a drill it is dependent upon

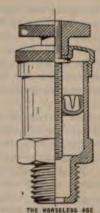
the size of the drill and the nature of the material being drilled. The chuck takes drills up to fifteen-sixty-fourths of an inch in diameter, and the maximum distance from the table to the chuck jaws is 43% inches. The height over all is 21½ inches, the maximum width is 9 inches, the depth 11 inches, and the distance from the drill spindle to the point where the table joins its support on the post is 31% inches.

The direct current machine is made with two speed variations, 800 to 1,600 or 1,200 to 2,700, and the alternating current machine, wound for sixty or 133 cycles, has the same speeds, but the machine wound for forty cycles is made only with a speed of 800 and 1,600 r. p. m. The net weight of each of these machines is 50 pounds, and they are wound for either 110 or 220 volts.

The other drilling outfit manufactured by this company is designated as No. 5, and is designed to operate only at 110 or 220 volts on direct current circuits. The motor is clamped to an upright spindle secured at one edge of the circular base plate, and may be adjusted vertically. The table is also adjustably clamped to the upright post and the chuck, which is mounted directly on the armature shaft, will take drills up to one-quarter inch in diameter. The speed of the drill ranges between 1,800 and 2,000 r. p. m., and the weight of the machine is 50 pounds. All of the above machines may be operated from an ordinary incandescent lamp socket.

#### Bennett Handy Grease Cup.

The Bay State Stamping Company, of Worcester, Mass., have recently brought out a grease cup which, with the exception of the thumbscrew, is made entirely of sheet metal. As shown by the illustration, the threaded shank permits the cup to be fitted flush with the outside of the bearing, so that only the body of the cup projects. The knurled head screw which actuates the sheet metal piston to force the grease from the cup is rotatably secured in the cap



BENNETT HANDY GREASE CUP.

which is threaded on the body of the cup. At no time does the screw project from the cap farther than shown, the piston being forced down by the action of the screw, because a lip which engages a groove in the cup prevents the piston from turning. The makers state that the piston fits the body of the cup air tight, and that if the grease became hot and melted it would not run out, because of this good fit.

#### The Dobbs Radial Light.

Arthur E. Dobbs, of 116 West Fourth street, Winona, Minn., has invented a mounting for headlights, by which the lights are automatically turned in the direction the car heads. Mr. Dobbs informs us that the methods of mounting the lamps on different makes of cars are covered by patents. As may be seen from the accompanying cut, the mechanism is quite simple, and is not at all conspicuous on a car. It consists of four levers (weighing less than two pounds), connecting the two headlights, which remain in the same location on the car, with the steering crank. It enables the driver of the car, without inconvenience to himself, and without forethought, to throw the light on the ground over which the car is to pass, by simply steering his car. It enables him to see



DOBES RADIAL LIGHTS.

where he is going, at the sharpest turns, as well on long curves on the road.

Being connected to the steering crank and not to the wheels, the up and down motion of the car on the springs does not affect the lights, nor is any lost motion, which may be in the front wheels, imparted to the lights.

The construction is claimed to be such that it will outwear any steering gear and could not be damaged without serious injury first occurring to the radiator or the steering gear. When properly adjusted to a car it is said to require no further attention.

By simply removing a pin from the steering crank, the lever connected to the lamps can be slipped off of the steering crank and on to a stationary pin, thus making the lamps stationary when not lit.

#### Chauffeurs Need Special Authority for Pledging Employers' Credit.

Judge Emden, in Lambeth County Court, England, a short time ago decided that a chauffeur is not entitled to pledge his emplover's credit without special authority to do so. An automobile repair man brought suit against a private owner for a sum of £25 10s. 7d. for repairs which he had made to the owner's car. An item of £3 5s. car hire was admitted by the owner, but as to the rest the defendant stated that the repairs had been ordered by the chauffeur without his knowledge or consent. The plaintiff gave evidence that the repairs were ordered by the chauffeur, and pleaded that the charges were reasonable, and that he paid no commission to the chauffeur. The judge, in giving his decision, stated that the question to be decided was whether the chauffeur had any implied authority to pledge his employer's credit. He said that although in case of emergency it might be possible that the same laws as in the case of ships applied there certainly was no expressed authority, and he held that there was no implied authority, as there was no emergency, to pledge the employer's credit. The judge pointed out that the case was of the greatest importance to automobile repairers, who, before starting on a job, should procure the authority of the owner of the car. The chauffeur stated that the accepting of commissions by chauffeurs was of everyday occurrence, but it was a highly salutary thing that the new law should be brought to bear in such matters strongly against any persons guilty of entering into such a contract. It was held that the plaintiff was not entitled to recover, except on the item admitted by the defendant

#### Boston's New Park Rules.

The Metropolitan Park Commission, of Boston, has increased the speed limit for motor vehicles on the roads and parkways under its control to 20 miles per hour, beginning August 1 next. Formerly the speed finit was 15 miles per hour, and only 10 files per hour in certain sections. Under

the former rules automobiles were excluded from that portion of Revere Beach reservation lying between Revere street and Revere Beach Parkway between 2 o'clock p. m. and 11 o'clock p. m. on June 17, and during the same hours on Saturdays, Sundays and legal holidays, between June 16 and September 14. Under the new rule automobiles are now excluded between 3 and 10 o'clock p. m. on the days mentioned.

# Publisher Munsey to Test Auto Reliability.

Frank A. Munsey, the newspaper publisher, is organizing what he calls the Frank A. Munsey Reliability Contest, and for which he has obtained an A. A. A. sanction. The course will be from Washington, D. C., to Boston and back over a different route, and the date selected is September 22 to 29, inclusive. One of Mr. Munsey's newspapers says that the tour gives promise of being of immeasurable benefit to the automobile trade.

#### Contact Area and Road Wear.

H. R. Mallock, F. R. S., recently read a paper on the new conditions of road construction since the coming of motor vehicles before the Institution of Civil Engineers in London.

He has made experiments on the area of contact between various paving materials and tires. The softness of rubber tires gives a larger area of contact and greatly reduces the mean pressure. The contact area of each tire on a London motor omnibus was approximately 13 square inches, giving a mean pressure of 120 to 140 pounds to the square inch. For an iron tired wheel of the same radius the area of contact would be 0.6 square inch and the mean pressure 3.000 pounds to a square inch.

With pneumatic tires it was nearly correct to take the pressure on the ground as uniform over the whole area of contact and equal to the air pressure in the inner tube. The area of contact was obtained by dividing the load by the internal pressure.

With regard to the effect of speed, the destructive effect could not be less than proportionate to the square of the speed, with a constant deducted, and it might be greater when the speed was high enough to make contact discontinuous. The distribution of pressure was changed with the stages of compression and expansion in the road over the area of contact.

#### New Road Material.

A practicable and inexpensive substance—the Everitt-Metropre-Fland material for the construction for the characteristic plane upon the market Wisconsin had an home fells work that the first income for which the many committees of "tailings," the results of the rounds had in order of mills for grinding tree, howelves their constructions which the same as a substitute for crushed at me for miles to be limited to the material now commonly used.

The discovery has interested Governor John in home and tool chest.

A. Johnson, of Minnesota, who visited the Wisconsin fields recently and investigated. At one mine alone there are 80,000 tons of tailings, which are given free for the hauling, and business men of the cities in the mining districts have adopted Governor Johnson's suggestions and are already spreading them over the roads, then packing them by means of steam rollers. The tailings include limestone, which obviates the need of any sort of binder for the top dressing.

# Bartholomew Company Buys New Factory.

J. B. Bartholomew has purchased the old Sieberling factory in Peoria Heights, Ill., for \$14,000. The plant was built by the Sieberling Company some twenty years ago, and used for the manufacture of bicycles during the height of that industry. In recent years it was occupied for a short period by the St. Louis Automobile Company, which failed some time ago. It is the intention of the new owners to manuture the heaviest parts of Glide cars, such as axles, steering gears, etc., in the newly acquired plant. The company is urging the town to construct an improved road leading to the factory.

#### New Jersey Ocean Boulevard.

A meeting of the New Jersey State Highway Commission with freeholders of Cape May, Ocean, Atlantic and Monmouth Counties was held in Sea Girt, on July & to decide upon the location of the proposed ocean boulevard from the Highlands to Cape May City. A slight change from the originally proposed plan was made, the coast route from Mantoloking being abandoned and a curve out from there made to Burrsville, and thence by inside route to Toms River. The object of this change is to avoid an expensive bridge at Seaside Park. It is thought that the proposed boulevard will be used mainly by automobiles. and the delegates to the meeting were of the opinion that the burden of keeping it in repair should be borne by motorists. It was stated that an increase of 50 per cent. in the license fee would net \$100,000 additional revenue per year, and Governor Fort was urged to recommend such an increase in the license fee imposed on automobies

#### Everitt and Metzger Reported Backing New Million Dollar Company.

Romers have been current in Detroit that W. E. Margor, B. F. Everitt and William K. I., who some months ago withdrew from the Everitt-Metagor-Flanders Company, are clarified to regarde a new company and place upon the market a \$500 car, on the feed upon the market a \$500 car, on the feed upon the feed to that 25,000 of these regularity to be styled the E-M-K, are to be looked it is to be a 20 horse power register with a single rumble seat, and equipped with head, side and tail lights, bern and tool chest.





# Effect of Altitude on Carburetor and Motor Action.

Liditor Horseless Age:

My attention has been called to several unusual problems in automobile work, and I take the liberty of asking you to give me your opinion on same. Also, please inform me if you have ever published any answers to the following questions, and when:

Suppose I toured through the West in my car, built by an Eastern builder, and during my trip I arrived at the city of Denver. The altitude of Denver is, I believe, about 5,000 feet above the sea level.

No. 1. What effect would the lessened atmospheric pressure have on the carburetor's action? Could I remedy same, and how?

No. 2. Would the lessened pressure affect to any noticeable extent the work of the gas mixture in the cylinder?

No. 3. Would the explosive pressure be less by reason of the air being lighter and correspondingly smaller amount of oxygen per cubic foot?

No. 4. Would not the water by reason of its lower boiling point at this altitude permit the cylinders to become dangerously warm?

What arguments are advanced for or against the use of sub-frames upon which to place or suspend the power plant; that is, the motor and transmission gear?

E. B. GUTHRIE.

The effect of the rarification of the air at high altitudes on the carburetor is the same as that of a partial closing of the throttle valve. If your carburetor is an automatic one, it should give a substantially perfect mixture at all positions of the throttle, and should, therefore, also give a substantially perfect mixture at a considerable altitude, even though it is adjusted to work at ordinary altitudes. At an altitude of 5,000 feet above sea level the density of the air is decreased by about 17 per cent., and that much less air will be taken into the cylinder at each stroke. The explosion pressure and the work obtainable from each charge will be reduced at least in the same proportion. There is no danger of the cylinder becoming overheated by reason of the reduced boiling point of water. Owing to the fact that the cylinder takes in less charge at each explosion, the cylinder walls absorb less heat than where the atmospheric conditions are normal. The whole subject of the operation of gasoline motors at high altitudes was discussed in an article by Mr. Clough in THE HORSELESS AGE for June 27, 1906.

The chief argument in favor of the subframe for carrying the motor and change speed gear is that it protects these parts against the twisting strains due to the distortion of the main frame, so that there is less likelihood of the supporting arms on the crank case and gear case being broken or the cases themselves damaged. Another advantage is that the cases need not be cast with such long supporting arms, which are more or less troublesome, both in casting and in machining. The argument in favor of the method of supporting the engine and change gear directly upon the main frame is that it does away with an unnecessary part, which makes for simplicity in construction.—ED.]

#### Queries.

Editor Horseless Age:

Many thanks for the clear explanations given to some questions I recently asked in regard to the throttle and spark control. If you will kindly answer the following questions you will be doing me a great favor and incidentally settle some disputes.

- 1. On a four cylinder, 30 horse power car is it a safe practice to go down hills by cutting off the magneto, thus allowing the engine to act as a brake? If it is dangerous, why?
- 2. Last year on most of the cars that had the sliding gear I noticed that the application of the emergency brake also disengaged the clutch. This year I notice that a number of well known cars operate the clutch by the pedal, when last year they did it the other way. Can you give any reason for the change? Which way would you prefer?
- 3. I have a Bowser gasoline storage outfit, and the pump is fitted with two fine wire strainers. Do you think it is necessary to filter the gasoline through a chamois skin when filling my car? The Bowser people claim, of course, that the chamois is not needed, but I wanted to find out what you think about it. It takes so much more time to run it through a chamois that I do not want to do it unless I have to. G. W. C.

[There is absolutely no danger in descending hills with the magneto cut out and the motor acting as a brake; in fact, it is the best method of descending long, steep hills.

We do not know just what make of car you refer to in your second query. At one time it was a very prevalent practice to interconnect both brakes with the clutch so that the engine would be disconnected from the car before the brakes were applied. The advantage claimed was that the engine would thus be protected from the shock of braking, and another advantage would be that the car can be brought to a stop more quickly, as the energy stored up in the flywheel and other moving parts of the engine need not be dissipated by means of the brakes. But if the brakes are both interconnected with the clutch it is impossible to use the engine as an auxiliary brake. For this reason many manufacturers now compromise the matter and interconnect only one brake with the clutch, and others make both brakes independent of the clutch

As regards the necessity of filtering gaso-

line through chamois skin, after it has once been filtered through wire gauze, you can safely trust the instructions of the manufacturers of the storage outfit, whose experience in this matter is very large. Fine wire gauze will not pass sediment that is likely to obstruct your carburetor, and the water is usually separated by means of a gravity arrangement. That is, at the bottom of the strainer there is usually a settling chamber in which the water collects and from which it can be drained at intervals.—Ep.]

# General Motors Buys Cadillac Plant.

The General Motors Company has added to its manufacturing resources by the purchase of the factory and equipment of the Cadillac Motor Car Company, of Detroit, Mich.

The capital stock of the Cadillac Company is stated to have been \$1,500,000, made up of 15,000 shares of \$100 each. These shares are said to have been held as follows: William H. Murphy, 3,055 shares; Lem W. Bowen, 2,840; Clarence A. Black, 2,840; Albert E. F. White, 1,607; Union Trust Company, trustee, 1,607; H. M. Leland, 1,340; W. C. Leland, 1,340; E. A Leonard, 179; Ernest E. Sweet, 107; H. H. Pattee, 50; A. C. Leonard, 35.

The first offer made for the stock is said to have been 160, which was afterward increased to 200. The final purchase price is said to have been about 300, making the total paid in the neighborhood of \$5,000,-The strongest local report is that the deal was made on a cash basis, and carried through as a whole. There is a rumor, however, that General Motors agents bought stock quietly from individual owners until they obtained a controlling interest. As in most big deals, the public is at liberty to accept whichever version it likes best. W. C. Durant states that the management and policies of the Cadillac Company will be continued unchanged. W. C. Leland will remain as manager, with H M. Leland as adviser.

The fact that the Lelands retain the management of the Cadillac Company made it appear probable that they received stock of the General Motors Company in part payment for their Cadillac holdings, and rumor has it that they got \$100,000 of such stock. In this connection, the sharp fluctuations during the past several months in the price paid for this stock in Detroit are of some interest. Early in April it sold at about \$50 a share. In June the price was boosted to \$130 a share, but it was then stated that the stockholders were offered stock at \$100 a share. The result was a sudden drop in the price of the stock to \$107 the first week in July. Whether the acquisition of the Cadillac property will brace the market for G. M. stock remains to be seen. According to a report in a Detroit paper, the Cadillac Company has declared one dividend of 10 per cent. and one of 25 per cent. this year, 1909.

# Commercial Applications.



#### Rapid Fire Gun on Motor Truck.

The largest automatic gun in the world was tested recently at Cleveland, being the first Government test of a heavy rapid fire gun mounted on a motor car. A Packard 3 ton truck was used for the demonstration. Lieut, Col., O. W. Lissack, of the ordnance department of the United States Army, and Dr. S. W. Mc-Clean, designer of the gun, had charge of the tests, being assisted by the Standard Automobile Company, the Cleveland dealer for Packard motor cars and trucks.

The gun fired 3 pound shots at the rate of 100 per minute, the range being 3½ miles. Shots were tried with the brakes of the car set and also released. When the brakes were set the truck did not move and no shock was felt by those surrounding the gun on the truck platform. With the brakes released there was a slight movement on the recoil, but no shock. The designer of the gun recommends its use on armored trucks.

#### Wholesale Milk Delivery by Motor Truck.

The Plainfield Transfer Company is operating an automobile truck as a freight car between Indianapolis and Plainfield, the latter being about 20 miles west of Indianapolis. It is patronized almost exclusively by farmers who send their milk to the Indianapolis creameries, paying the transfer company 2 cents a gallon for making the haul. Farming implements and other articles purchased by the farmers in Indianapolis are delivered at the farmers' doors.

#### Commercial Notes.

An automobile line is in contemplation between Rome and Adairsville, Ga., a distance of 18 miles. Capitalists of Rome are said to be behind the project.

Dishmaker Brothers, of Kewaunee, Wis., a small department store, with a heavy rural trade, has purchased a runabout for canvassing and delivery in the country dis-

M. J. McDonald, 1084 N. High street, Columbus, Ohio, has ordered a number of taxicabs which he will operate in that city. The first of the cabs was to be delivered this week.

A. Lethoff, superintendent of the machinery departments of the string of sugar beet factories operated by the United States Beet Sugar Company, has purchased a four cylinder roadster, to cover his extensive territory in western Wisconsin.

Chief Thomas A. Clancy, of the Milwaukee (Wis.) Fire Department, will be



RAPID FIRE GUN MOUNTED ON MOTOR TRUCK.

the principal speaker at the annual convention of the Wisconsin Paid Firemen's Association, at Madison, Wis., on August 10, 11 and 12. His subject will be "Are Auto Fire Apparatus a Success?"

The Southern Railway Company is experimenting with automobiles for the transportation of passengers and hand baggage between Manassas and Strasburg, Va. The distance between these two points is 61 miles

The Nashville Taxicab Company, Nashville, Tenn., inaugurated its service with three cabs on June 29. The company has its offices and garage at 112 Third avenue South. James Frazer is president and Banks Bennie secretary and treasurer.

Manager Swift of the Swift Taxicab Company, Trenton, N. J., has resigned, and the business will in future be conducted by Nicholas Snyder, the principal stockholder, and Joseph Buch, manager of the Trenton House, under the name of the Trenton Taxicab Company. The company operates two machines and has a stand at the Trenton House. Two additional machines will shortly be placed in service.

A 2 ton gasoline truck has been purchased by the Indianapolis Brewing Company, Indianapolis, to be used in its city delivery work. Some years ago the company purchased a 5 ton electric truck but because of the enormous loads it carried it was barred from the paved streets. At present the electric truck is used for hauling between the brewery and freight yards. The Polk Milk Company, of the same city, has purchased a 3 ton truck, to be used in collecting milk through the rural districts.

A project is on foot for establishing an automobile service between Rosswell, N. M., and Monterey, a new town on the El Paso and Southwestern railroad, 100 miles north of El Paso. The town of Rosswell is willing to build the road from that city to the Lincoln County line, and if the authorities of Lincoln County will agree to build the road in their territory, the project will, no doubt, go through. Such a

line would greatly improve the mail service to twelve to fifteen inland post offices which now can only be reached on horseback.

#### Racing Drivers Killed.

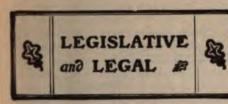
C. K. Batchelder, of Newport, Vt., and J. Twohey, of Montreal, were killed at the second annual races of the Canadian Automobile Club at the Blue Bonnets track on July 9. Batchelder was driving a 60 horse power car in the 10 mile open race for stock touring cars, and Twohey was his mechanic. When turning out to overtake another car Batchelder's 60 horse power car skidded and dashed into the fence, and the two occupants were thrown out. Twohey was killed instantly and Batchelder died shortly after his arrival at the hospital.

#### Minneapolis Representation.

Lindsay Brothers, an agricultural implement firm of Minneapolis, Minn., located at the corner of Fourth avenue North and First street, some time ago entered the automobile business by taking the agency for solid tire cars. They now wish to take on, in addition, a good car of standard type, that will appeal to the city trade as well as to country customers, they covering the country districts of five or six States. The firm is somewhat inclined toward cars that have been on the market for some years in preference to entirely new makes.

#### New Detroit Sales Company.

The Michigan Motor Sales Company has just been organized in Detroit to handle the Oakland and Welch cars. The new company will occupy the Fee Electric Garage, on Jefferson avenue, which is being remodeled to handle gasoline machines. The electric garaging will be carried on in the basement, which opens on the street level at the rear of the building. William A. Brush, who has managed the garage of the Standard Auto Company, for some time past, is at the Head of the new organization.



#### Recent Decisions.

ILLEGAL SPEED EVIDENCE OF NEGLIGENCE.

On a conviction of the owner of an automobile and his chauffeur for manslaughter in the second degree for colliding with a buggy on the highway, and causing the death of one of the occupants of the vehicle, who was injured by being kicked by the horse at the time of the collision, it was held that the owner of the car was not responsible where he did not contribute towards the accident. It was further held that there was sufficient circumstantial evidence to show that the buggy was struck by the auto, although there were no marks on the auto, and that reading to the jury the statute regulating the speed was not error, as driving at a speed prohibited by law was evidence of negligence and might have been so charged .- People vs. Scanlon, 117 N. Y. Supp. 57.

DRIVER AND PASSENGER OF HIRED CAR.

In an action for injuries resulting in the death of a passenger in an automobile run for hire, where the injuries were caused by negligence in operating a trolley car at an excessive rate of speed, it was held that the negligence of the chauffeur was not imputable to the passenger where it did not have, and exercise, control over the chauffeur, and that running a street car in excess of lawful speed was negligence.—Wilson vs. Puget Sound Electric Co., Wash. 101 Pac. 50.

TOLL ROAD PUBLIC HIGHWAY.

In a prosecution for a violation of the Wisconsin speed law in running an automobile at excessive speed on a public highway, it was held that a toll road within the corporate limits of a village, operated by a private corporation, was a public highway.—Weirich vs. State, Wis. 121 N. W. 652.

#### Taxicabs Enjoined from Cruising.

An attorney claiming to represent about 1,500 independent cabmen of New York city last week applied to the Supreme Court for an injunction restraining the New York Taxicab Company from picking up fares in the streets, except with those of its machines which have special public licenses. He alleges that the majority of the cabs owned by the company are licensed only to occupy stands in front of certain hotels. The city issues two kinds of hack licenses, one allowing the vehicles to pick up fares at stands which they are allowed to occupy by arrangement with the property owners in front of whose premises these stands are located, and the other allowing the cabs to be driven through the streets in search of fares. The latter class of cabs are distinguished from the former in that they are required to carry numbers on their

lamps, which the former are not required to do. The complainants allege that the New York Taxicab Company has public hack licenses for a few of its cabs, but the majority are operated from stands. However, they allege, the company has double sets of lamps, and whenever business on a stand gets dull the driver merely exchanges his unnumbered lamps for a set of numbered ones and sets out to pick up fares in the streets. It is further alleged by the complainants that some of the cabs of the New York Taxicab Company assume stand privileges in front of restaurants, etc., claiming that they are being held by a fare within the restaurant, but in reality only looking for fares.

A temporary injunction was granted by the court on July 10.

Proposed Milwaukee Ordinance.

The common council of Milwaukee, Wis., is working on an ordinance designed to supplement the State auto laws. It was originally introduced by Cornelius Corcoran, president of the council, more than a year ago, but since that time a number of important amendment have been framed. Cars must come to a full stop when running behind a street car that stops at a corner to permit passengers to alight or enter, until the car starts and all passengers are on the sidewalk or platform. Columns bearing red lights are to be established at street intersections to divide the traffic. A speed limit of 8 miles an hour is prescribed within a territory comprising about thirty blocks in the downtown business district. All unnecessary noises are to be eliminated. The original Corcoran ordinance contains a clause requirng all operators to be examined and licensed, but this provision will, it is expected, be removed as unnecessary and a hardship.

Columbus, Ohio, to Regulate Garages.

Fire Chief Lauer, of Columbus, Ohio, will introduce an ordinance at the next session of the city council which will provide that no garage shall be more than one story high and that the structures shall be built of fireproof material. "No smoking" signs must be displayed, and the storage and handling of gasoline are closely regulated.

Society of Motor Car Selling.

The Society of Motor Car Selling was organized at Detroit during the week preceding the start of the Glidden Tour. The membership comprises a number of men in charge of the advertising departments of automobile factories. E. Ralph Estep, of the Packard Motor Car Company, is president; George M. Davis, of the Pierce-Arrow Company, secretary, and Charles W. Mears, of the Winton Motor Carriage Company, treasurer. These officers, with two members, constitute the board of directors. A charter will be secured in a short time, and then headquarters will be established.

#### The Buffalo One Gallon Ton-Mileage Contest.

Last Wednesday, July 7, the Buffalo A. C. held its fuel economy contest, which was announced only a little more than a week previously. Each competing car was given one gallon of fuel and was weighed with all passengers on board, and the product of the distance traveled on this amount of fuel by the weight of the car constituted the score. The run started at I o'clock, with twenty entries, nineteen of which finished. The course was from the corner of Main and Goodell streets to the foot of the hill near Clarence Hollow, a distance of 161/2 miles. Herbert A. Meldrum, ex-president of the club, officiated as referee, and Laurens M. Enos was chairman of the committee in charge. A large number of enthusiasts witnessed the event. The chief honors of the event were carried off by S. G. Averill, who drove a 1910 Franklin car. He succeeded in driving his car, which weighed with load 2,948 pounds, 46.1 miles on the supply of one gallon of fuel, making his score 135,902. The tonmiles per gallon figure out to 67.95, which is by far a world's record.

The Franklin was an 18 horse power touring car which went through the competition without road stops or trouble. The course was slightly rolling, with grades of about I per cent., and on the outward trip there was a slight head wind. The roadway was first one of good asphalt, then in succession brick of indifferent quality, badly worn macadam, a stretch of good macadam followed by one of bad macadam, full of holes, and crossed by high crosswalks, and finally a fair piece of State road. In addition to capturing the general contest trophy the Franklin won the trophy for its class, which was for motor cars ranging in value from \$1,001 to \$2,000.

The results follow:

			Miles	
	. 1	Weight	. Cov-	
Car. Driver.	Class	. P'ds.	ered.	Score.
Rambler, Carter	. C	4,023	19.3	77,644
Overland, Al Poppenberg	. B	3,216	26.5	85,224
Reo, Parkhurst	. A	2,016	35.4	71,366
Buick "ro," Lacy	. A	2,190	26.1	57,129
Buick "17," Whiting	. B	3,806	15.6	59.373
Hupmobile, W. S. Jones	. A	1,600	36.8	58,880
Cartercar, Engle	. B	3,190	21.8	69,542
Franklin, S. G. Averill.	. B	2,948	46.1	135,902
*Rambler, Longnecker	. B	2,861	17-1	48,923
Overland, Frye	. B	3,025	Did no	t finish.
Maxwell, Chittenden	. A	1,781	37.6	56,280
Maxwell, Munro	. B	3,124	17.7	55,294
*Reo, Weiss	. A	1,968	28.4	55,891
*Cadillac, Baker	. B	3,380	20.2	68,276
Oakland, Bauer	. B	2,360	36.7	86,612
Brush, Dussmier	. A	1,432	41.2	58,998
*Ford, Williams	. A	1,544	30.9	47,709
*Mercedes, Steinbrunner	. E	4,330	16.8	72,744
Interstate, Sherman	. B	3,411	18.7	63.785
*Thomas, Gorton	, C	3,699	16.2	64.249
* Amateur driver.				
Class A. \$1,000 and und	er; Cl	ass B,	\$1,000	\$2,000;

Class A, \$1,000 and under; Class B, \$1,000-\$2,000; Class C, \$2,000-\$3,000; Class D, \$3,000-\$4,000; Class E, \$4,000 and over.

Class A—(Professional), Reo, 1; Brush, 2; Hupmobile, 3. (Amateur), Reo, 1; Ford, 2. Class B—(Professional), Franklin, 1; Oakland,

Class B—(Professional), Franklin, 1; Oakland, 2; Overland, 3. (Amateur), Cadillac, 1; Rambler, 2,

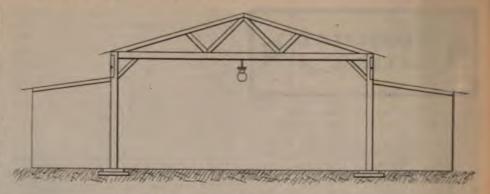
Class C-(Professional), Rambler, t. (Amateur), Thomas, t.

# GARAGE



#### A Denver Garage Enterprise.

The Denver Omnibus and Cab Company, of Denver, Col., operate three large and distinct garages and showrooms in that city. The largest of these is at 1643 Court place, and is claimed to be the best equipped establishment of its kind in the West. The building contains four stories and a basement, and affords 32,000 square feet of floor space. The basement contains the heating plant, and is also used for the storage of cars out of commission. The third floor contains the machine shop, which is equipped with a variety of machine tools driven by electric motors. The equipment of this shop is said to have cost about \$5,000. This floor also has a body department. An air compressor is located at the back of the body department, and piping from this compressed air plant runs to all floors, a pressure of 150 pounds being constantly maintained. The fourth floor serves as a storeroom for parts of machines for sale and as a stockroom. The first floor is devoted to the sales department, of which department E. W. Swanborough is manager. The walls and ceilings of this floor are finished in pure white, and as this room has a great number of windows it is remarkably well lighted. The second floor is occupied by cars in regular use. A complete shop equipment is at the disposal of chauffeurs, and there are also lockers and a wash rack. The greater part of this floor, however, is taken up by the paint and varnish rooms. Lyman R. Stone is manager of the motor car department, and J. M. Kuykendall is proprietor of the establishment.



PLAN VIEW OF THE KAISER GARTEN GARAGE,

# The Kaiser Garten Garage, Coney Island, N. Y.

This garage was built to provide a place where the patrons of the Kaiser Garten, which it adjoins, may conveniently store their cars while dining or being otherwise entertained. It is located near Surf avenue on Twenty-fourth street, which is toward the Sea Gate end of Coney Island, and somewhat removed from the noisy part of the resort, where the many attractions which have made it world famous are grouped.

The building occupies a space 80 feet wide and 150 feet long. It is quite suitable for its purpose, and may be taken as an example of the type of garage building which can be erected for a comparatively, small outlay for material and labor. This is a necessary consideration, because of the transitory nature of the seaside garage business, which prohibits the investment of a large sum in a building used for only a portion of the year. The framework of the building is of wood, and about ten feet from each side there is a row of eight posts which

support the trusses for the roof. That portion of the roof over the central part of the building is of tar and gravel. Extending lengthwise of the building, under the eaves, there is a continuous row of swinging windows on each side, as shown by the sectional elevation. These windows afford ample daylight illumination and ventilation. The roof and sides of the lateral bays which adjoin the central space are of corrugated iron, and the front and rear of the building are of stamped metal arranged and painted to represent stone blocks. There is one entrance to the building and that is about 25 feet wide, ample for two cars to pass each other. The entrance is closed by two sliding doors, one of which contains a small swinging door. The floor of the entire building, with the exception of cement stand, centrally located at the far end, is of cinders and gravel, which have been packed hard by rolling. This floor material, while not as clean or sightly as concrete or cement, has advantages, because it will absorb the oil which drips from the cars, and atmospheric moisture, which is always present at the sea-



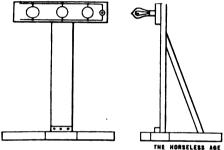


Two of the Garages of the Denver Omnibus and Cab Company.

side, does not condense and collect on it, as it does on concrete.

At the right of the entrance there is a small space partitioned off, which contains a desk and a couch for the use of the night attendant. This room is used as an office and storeroom, in which such parts as dry cells, shoes, tubes, carbide and canned lubricants are kept. Adjoining the office there is a workbench with two vises and an assortment of hand tools, it having been found inadvisable to install a machine tool equipment because of the small quantity of machine work which comes to a garage of this class. The management of the garage, however, also conduct a completely equipped repair shop conveniently located to Coney Island, where such repairs as come to the garage are sent.

Directly above the centre of the entrance there is a flaming arc lamp which affords ample illumination to show the painted Alpine scenery which adorns the top of the front of the building and causes it to harmonize with the surrounding decorations. The interior of the garage is illuminated by two Nernst lamps, which are suspended from the centres of the second and sixth roof



PORTABLE LIGHTING FIXTURE.

trusses, and furnish a soft, evenly distributed light, which is entirely satisfactory, because the annoying glare of open arc lamps and the uncertain illumination of incandescent lamps are absent. For brightly illuminating a car while it is being washed or repaired, the portable lighting fixture shown is used. It is a home made affair and consists of a T shaped upright of 3/x4 inch yellow pine, braced by a similar piece to the base, made of heavier stock, and arranged in the form of a cross. Three 32 candle power incandescent lamps are secured to the crosspiece as shown, and are wired to a plug socket which is adapted to be connected to the lighting circuit by a flexible cable.

Gasoline is stored in a buried tank located beneath a brick corrugated iron roofed house, which contains the pump connected to the tank. This house is removed about 30 feet from the garage and the space between it and the garage is enclosed by a fence, so that cars may be safely stored in this space in fine weather when the building is filled to its capacity of ninety cars. The usual system of checking the cars by means of duplicate brass tags, one of which is attached to the hand wheel of the machine by a leather strap and the other taken by the driver, is used here, and seems to be entirely satisfactory. The storage rate for transients is 25 cents for six hours or less for all days, with the exception of Saturday, Sunday and holidays, when the charge is 50 cents.

#### Garage Notes.

D. Harding, Madison, Ind., is erecting a garage on Post Office Square. He will do repairs. The Glide Motor Co., of St. Louis, agents for

the Glide car, have opened a salesroom at 3964 Olive street.

The Auto Trading Co., Cleveland, Ohio, recently opened a garage on Euclid avenue. They will specialize in the second hand car and livery business.

The Prince Wells Company, well known automobile dealers of Louisville, Ky., are reported to be negotiating with the Wright Brothers for their acroplane agency.

W. G. Redmon and E. L. King will open a garage in a new building, 34x80 feet, at the corner of Lexington avenue and Maple street, Winchester. Ky., about August 1.

McConnell & Clark, Cadillac, Mich., have recently occupied their new garage, which has a storage capacity for fifty machines and comprises a well equipped machine shop.

A new automobile garage of concrete construction, 50x100 feet, is being erected on East Front street in Florence, Col. The garage has been leased to a local automobile dealer.

Cuyler Lee, of San Francisco, agent for the Packard and Cadillac cars, has opened a branch office at 119 Telegraph avenue, Oakland, Cal. The new branch is to be in charge of R. E. Silver.

The Ferguson Parkway Garage, New York city. have bought out the Taxa-Auto Cab Company at 110th street and Central Park West. The building will be completely remodelled. J. A. Horwitz is manager.

The Los Angeles branch of the H. O. Harrison Company, Western representatives of the Peerless Motor Car Company, has been placed in charge of Thomas Williams, H. O. Harrison, formerly at the head of the branch, having gone to San Francisco.

E. N. Fowler, manager of the Palmer-Singer Company, is making arrangements to open an agency in San Francisco. The company expects to market part of the product of its factory on the Pacific Coast, which offers an excellent field for the sale of motor cars.

F. DeWitt and S. J. Mathews have leased the Armory Building, in Fort Clinton, Ohio, and opened a garage under the style of the Standard Garage. They have facilities for storing fifty cars and expect to take on a number of agencies. pair shop is conducted in connection with the garage.

The White Steamer Automobile Co., has leased the property at 26,33-2709 Wabash avenue at an annual rental of \$1,500 for the site, and 7 per cent. on the cost of the building, which is expected to reach \$120,000. The lease runs for twenty years. A four story reinforced concrete building is to be erected.

The Sheridan Motor Car Co., Sheridan, Wyo. have opened their new brick garage at Gould street and Grinnell avenue. The garage is 40x90 feet, two stories high, and will accommodate twenty cars. A machine shop is attached to the garage, which is in charge of James McGee. The company handles the White steamer.

After an existence of twenty years, the Indianapolis Transfer Co. has gone out of business in Indianapolis, to be succeeded by the Delaware Garage. Those interested in the new company include John E. Morand, formerly president of the transfer company. Others in the company are Cecil E. Gibson, of the Gibson Automobile Co.,

and C. R. Newby, formerly with the State Automobile Co.

The Abar Auto Company, Devil's Lake, N. Dak., have begun work on a new garage building.

#### New Incorporations.

Pullman Motor Car Co., York, Pa.-Capital stock. \$10,000.

Park Avenue Garage Co., Meadville, Pa.-Capital stock, \$5,000.

Speed Sales Co., Chicago, Ill.—Capital stock, \$40,000. Incorporators, Arthur W. McGovney, F. Rathje and H. Clay Calhoun.

Colonial Rubber Works Co., Chicago, Ill.-Capital stock, \$7,000. Incorporators, Henry Nyberg, Everett McConnell and Emerson McConnell.

The Delaware Garage Co., Indianapolis, Ind.-Capital stock, \$5,000. Incorporators, John E. Marand, Paul R. John and Cecil E. Gibson.

The Meiselbach Manufacturing Co., Milwaukee, Wis.—Capital stock, \$50,000. Incorporators, A. D. Meiselbach, S. Wallheim and L. W. Clough.

Panacea Springle Automobile and Electric Transfer Co., Winston-Salem, N. C.—Capital stock, \$125,000. Incorporators, Eugene Johnston and

Siegmund-Baylies Co., Chicago, Ill.—Capital stock, \$40,000. To manufacture and deal in motors and other merchandise. Incorporators, O. S. Baylies, E. H. Arnold and A. C. Noble.

#### Trade Personals.

John G. Utz has resigned his position with the engineering department of the Chalmers-Detroit Motor Co. It is reported that Mr. Utz will be connected with a company which is about to start the manufacture of automobiles.

The employees of the Bausch & Lomb Ontical Co., Rochester, N. Y., last week erected a bronze and marble tablet at the factory of the company in memory of Henry Lomb, one of the founders of the firm, who died a year ago.

E. W. Nothsine, of Flint, Mich., has been appointed manager of the St. Louis Buick branch, and assumed his new duties on July 1. Nothsine succeeded H. M. Blake, who went to Chicago to engage in a different line of business.

It is reported that Col. Albert A. Pope, head of the Pope Manufacturing Co., is seriously ill at his home in Cohasset, Mass. It is stated that his nervous system was nearly wrecked by the vicissitudes through which his firm passed several years ago, after the collapse of the bicycle boom.

Head Salesman Van Slyke, of the Iowa Automobile and Supply Co., has resigned that position, and accepted the sales management of branch of the White Co., Cleveland, Ohio, for the territory including Iowa, Missouri, Nebraska and Minnesota. Mr. Van Slyke will continue to make his headquarters in Des Moines.

#### New Agencies.

Boston, Mass.-Chas. G. Whitcomb, Darracq. Philadelphia, Pa .- Chalmers Fanning Co., Hud-

Syracuse, N. Y .- Amos-Pierce Auto Co., Hud-

Peru, Ind .- Peru Automobile Co., Great Wes-

Denver, Col.-The Independent Automobile Co., American.

Stevens Point, Wis.-George Dietrick, Thor. motorcycle.

Minneapolis, Minn .- Pence Automobile Co.,

Oldsmobile.

Toledo, Ohio.--Wm. Love, Packard, for northwestern Ohio.

Ottawa, Kan .- King & Filson, Cartercar, Cameron and Rider-Lewis.

#### Trade Literature Received.

The Randall-Faichney Co., Boston, Mass .-"Jericho, the Horn."

Wilmington Fibre Specialty Co., Wilmington, Del -Price list of fibre.

Packard Motor Car Co., Detroit, Mich.-Folder, "What a Truck Hauls, and How It Hauls It."

#### m i n o r mention



G. W. Hall is organizing a company in Lebanon, Pa., to manufacture a car known as the New Willar. The old factory of the Acme Motor Company at Twelfth and Warner streets is being considered for a location.

The R. L. Kenyon Company, of La Crosse, Wis., manufacturers of tops, accessories for motor cars and boats, and cushions, have decided to build a new fire-proof factory. Upon its completion the force of fifty will be increased to 100.

The Taft-Peirce Manufacturing Company, of Woonsocket, R. I., who have been doing contract work for automobile manufacturers for a number of years, have taken up the manufacture of motors for automobiles and expect to be extensively engaged in this line within the next few years.

In the State of Michigan 1,000 automobile licenses and 1,200 renewals of old licenses were issued during the month of June. On the last day of the month 60 new licenses and 128 renewals were issued. Under the present law, which will remain in force until the end of the year, the fee for licenses is \$1, and for renewals 50 cents.

According to R. S. Berry, representing the Ohio Oil Company, in an application to the Indiana State Tax Board for a reduction in the company's assessment, the oil producing firms find it difficult to dispose of the distillates of crude oil other than gasoline. There is a very large demand for gasoline, and that leads to an overproduction of the other distillates.

The General Motors Company, which has recently taken over the Northway Motor Company, at Maybury, Grand and Grand Trunk, Detroit, has decided to enlarge the plant of this company, where motors will be made for the cars turned out by the General Motors Company. It will also enlarge the Michigan Auto Parts plant, in Old Delray, where change gears are to be made.

The Brighton Beach track, near New York, which about a year ago was laid out in building lots, after the fences had been torn down, has been leased by the Motor Racing Association, which will hold a series of racing tournaments on it, starting with a twenty-four hour race, on July 30 and 31. The Racing Association will rebuild the fences and bank the turns so as to make high speeds possible.

The Atlanta (Ga.) A. A. on July I elected the following officers: Asa G. Chandler. president; F. J. Cooledge, vice president: W. D. Owens, treasurer and E. M. Durant, secretary. This is the association which is promoting the construction of an automobile race track near Hapeville, Ga., which is expected to be completed by

the first of November. At the meeting the dates of the fall automobile races were fixed for November 9-13.

The Sellers Motor Car Company, of Hutchison, Kan., shipped its first car on July 3 to Oklahoma City.

The Highway Auto Oil Company, St. Louis, Mo., has opened a salesroom at 4971 Delmar avenue, in charge of P. Spellen.

A new building is being erected at 3928-3830 Olive street, St. Louis, which is to house the local branch of the B. F. Goodrich Company.

J. G. Rodman, district superintendent for the S. F. Bowser Company, of Fort Wayne, Ind., has opened an office in St. Louis in the Chemical Building.

The Boston Park Department has purchased two Columbia cars for the use of Superintendent Pettigrew and the Engineering Department, respectively.

J. M. Quinby & Co., of Newark, N. J., have introduced the term "tonnette" as a substitute for the compound terms "baby tonneau," "toy tonneau" and "miniature tonneau."

The Regal Motor Car Company, of Detroit, started one of their 30 horse power cars from New York on July 5 on a transcontinental trip to San Francisco, which is to be completed in thirty days.

A petition in bankruptcy has been filed against the Commercial Battery and Electric Company, of Chicago. The liabilities of the concern are estimated at \$35,000, while the assets are valued at only \$5,000.

The officers of the New York and New Jersey Metal Trades Association and the National Metal Trades Association report that in spite of the business depression the automobile manufacturers had their busiest year.

The American Auto Brokerage Company have opened a second hand automobile and motor boat business at 3910-3912 Washington avenue, St. Louis, Mo. The company is composed of L. J. Winkler and M. W. O. Finlay.

Norman J. Rimes has purchased an interest in the J. M. Newsom tire agency and repair business, St. Louis, Mo. The firm name will be changed to Newsom & Rimes. The shop and office of the firm are located at 4142 Olive street.

Considerable damage was done to the plant of the Seitz Auto Transmission Company in Detroit on Friday of last week by an explosion in a neighboring plant. All of the windows in the Seitz factory were shattered and some of the machine tools were torn from their foundations.

Work of surfacing the outer and inner courses of the Indianapolis motor speedway is under way, and will be completed the latter part of July. Both courses are being treated to a coat of taroid, which is expected to give it a rocklike surface. It is expected that the work will cost \$40,000.

L. J. Kinnell, former agent for Mitchell cars in Joliet, Ill., has disappeared with the funds of the Kinnell Automobile Company, of which he was president. The

store where the garage was located has been announced for rent, and the stock of the automobile company has been confiscated and will be sold at auction.

Mrs. Harriet Clark Fisher, of Trenton, N. J., will sail this week for France, from where she will start in an automobile tour around the world in a 40 horse power Locomobile. A "bon voyage" luncheon will be given to Mrs. Fisher at the A. C. A., New York, on Friday at I p. m.

The Pietsch Auto and Marine Company, of Chicago, is planning to remove its plant to Kalamazoo, Mich. It is stated that the company has been established for three years, is incorporated for \$30,000, and has turned out about 500 cars (?). If the plan of locating in Kalamazoo goes through the capital stock is to be increased to \$100,000.

The Vanguard Automobile Supply Company, of Joliet, Ill., of which C. F. Jensen is president, is considering a plan to remove to Salem, N. Y. The business men of the latter town are offering the company the free use of a building, 160x75 feet, with good shipping facilities. The company claims that it has been unable to secure a suitable location at 'a satisfactory price in Joliet.

The Franco-American Taximeter Company have moved to spacious quarters on Seventh avenue and Forty-ninth street, New York City, from which point they will direct the entire business, which has hitherto been in charge of Lavalette & Co., as rental agents. The new building comprises a garage and extensive repair shops. The company has branches in Boston, Washington, D. C., Chicago, San Francisco and New Orleans.

#### Club Notes.

The Cambridge (Ill.) Automobile Association was organized at the Town Hall in Cambridge on June 22. All owners of automobiles and motorcycles in Henry County are eligible to membership.

Alfred Howard has been elected vice president of the Bay State A. A. of Boston, Mass., to succeed Harlan W. Whipple, formerly of Andover, Mass., who has recently taken up his permanent residence in New York city.

The Milwaukee A. C. has been advised that it will not be able to have the use of State Fair Park mile circular track for its annual meeting until after September 17, the closing day of the Wisconsin State Fair, and all plans for contests before that time have been dropped.

The Western A. C. has been organized in San Francisco, and has leased the Jefferson Square Building, at Golden Gate avenue and Octavia street, which it will convert into a clubhouse. The club has elected the following officers: Louis A. Mooser, president; Dr. G. R. Hubbell, vice president; Wm. V. Lloyd, second vice president; W. N. Wright, secretary and treasurer.

#### Sixth Annual A. A. A. Reliability Tour.

BY CHESTER S. RICKER.

DETROIT. July 11.-On the morrow will start the hardest, longest and probably the technically severest motor car contest that has ever been held. The departure of the competing cars will be made the event for a great celebration. The cars will start at 10 o'clock from the Pontchartrain, which is the official headquarters of the contest committee. It would seem from casual observation that almost every trade and press representative of note is present. As usual, everyone looks to F. B. Hower, the chairman, for everything, and he must be credited with being one of the hardest workers on the tour. E. L. Ferguson, the secretary and starter, together with M. C. Reeves, the chief of observers, is among the most industrious. Indeed, ever since Friday they could always be found engaged in checking in the cars or in assisting the technical committee. Charles J. Glidden, the donor of the chief trophy, has been one of the leaders. Among the other automobile notabilities present are President Lewis R. Speare, of the A. A. A.; Vice President Frank M. Joyce and Secretary F. H. Elliott. So many members of the trade are present that it would be futile to attempt to give a list of them.

Glidden Tours have been started with some pomp and splendor before, but it must be said for the Detroiters that they so outdid themselves that the men in charge of the tour either had to neglect their duty or stay away from the long list of festivities which had been arranged.

#### ENTERTAINMENT OF TOURISTS.

On Friday evening the Detroit Automobile Dealers' Association, which took a very active part in the arrangements for the preliminaries of the tour, and which was instrumental in securing the start of the tour for Detroit, gave a banquet to the officials of the A. A. A. at the Hotel Pontchartrain. About 125 motorists attended. The chief speakers of the evening were F. B. Hower and Charles J. Glidden. Mr. Hower expressed his disappointment at the small number of entries for the tour, and pointed out again the causes for the lack of interest among manufacturers. He said in part:

I was disappointed; all of us in the "Three A" were disappointed when we received so many refusals. We do not like to see the American manufacturers so wrapped up in their industry that they forget their sportsmanship. I can only say that we who have been behind this affair have done out best. The Detroit dealers came to me with \$3,000. They begged to have the start of the tour. I could not resist the temptation to give it to them.

If anyone had asked me at that time how many entries we would have I should have guessed about 125. We all guessed that. And then came the revelation. I began to receive letters from manufacturers all over the country. They found they could not enter the tour. The reason was that they were enjoying too much prosperity. They said, "Why should we enter this contest when we are unable to supply the demand now?

The advertising will do us no good." And so we have far fewer cars in the contest than we originally guessed.

I may tell you, gentlemen, that this auto business may be to the manufacturers an industry. To us who own and drive cars it is a sport. We are interested in these contests for the sport they offer. I do not say those manufacturers who made excuses were afraid of the sporting chance. I will not say it, gentlemen. That would be unfair to them, and so I will not say such a thing, but they did not enter, and I may tell you that we must keep up the sporting end of the industry if we wish to maintain the industry itself.

I shall be criticised, gentlemen, for what I am saying tonight. But I don't care. I am not here to promote the industry, but to promote the sport through contests. I say that those manufacturers who did not enter this tour hurt themselves, not us, for the Glidden Tour shows the progress of the automobile. Those who are unwilling to show what progress they have made are hurting the industry, not the sport.

Don't tell me that any manufacturer who could know he could win that trophy would refuse to enter. I will not call those who held out cowards, gentlemen, but there is not a manufacturer in the country who would refuse to join the contest could he know positively that he would be the winner.

The first speaker of the evening, Mayor Breitmeyer, presented Mr. Hower with a gold key to the city. President Speare then told how the farmer was making the automobile industry the power which it is in the prosperity of the nation. Charles J. Glidden then spoke and related his experiences during the years of touring which he has enjoyed. George C. Diehl then made a plea for good roads, especially aid in organizing a national good roads association. He made the statements that but 7 per cent. of the roads of the country are improved, and that without Federal aid the individual States can do little.

Hugh Chalmers next spoke on "The Automobile Industry—Not Game." He emphasized the necessity of the following qualities for the success of the business: Honesty, initiative, sincerity, openmindedness, enthusiasm. Benjamin Briscoe gave a short humorous address, but did not say much about the industry, as he was requested. Finally Colonel Pardee closed the evening with a clever little talk on the automobile and women.

President George Lane, of the D. A. D. A., was toastmaster. The great success of the banquet, as well as of the festivities which followed, is a great credit to the local Glidden Tour committee. The Detroit trophy, which is an exquisite piece of porcelain work, was officially handed over to the tour committee during the evening.

Saturday the following events were carried out most successfully: Automobiles conveyed those who desired from the Pontchartrain to the various factories. During the forenoon the executive committee of the A. A. A. met at the Hotel Pontchartrain. In the afternoon a big automobile parade took place. Also an entertainment was tendered to the executive board by the Auto Club of Detroit.

On Saturday afternoon, July 10, an auto parade was held in Detroit in honor of the Gliddenites, and proved to be the biggest thing of the kind ever arranged. There were 1,030 machines in line, over 400 of which were decorated. Many of the decorations were unique and beautiful. The parade started at the corner of Woodward avenue and the Grand boulevard, proceeded down Woodward to Jefferson, and along Jefferson to Belle Isle Bridge. Crossing the bridge it circled the island, the cars being parked at the southern end, where an immense group photograph was taken.

The prizes, so far as announced at the time of writing, were awarded as follows:

Sweepstake, Cadillac Motor Car Co. Lady's special, not announced.

COMMERCIAL FLOATS.

First prize, Vinton Co. Second prize, Morgan & Wright.

ELECTRIC CARS.
First prize, Anderson Carriage Co.
Second prize, Mrs. Eva Beecher.

GASOLINE OR STEAM CARS. First prize, in doubt. Second prize, Maxwell-Briscoe Co.

#### MOTORCYCLES.

First prize, lady in purple and green costume. Second prize, lady representing Columbia. Third prize, gentleman in leather suit. (Names not known.)

Attractive music was furnished by the Maxwell-Briscoe Band.

After the parade there was a series of athletic contests and ball games between teams from the local factories. While the parade was a striking success, in respect to the enthusiasm it aroused among Detroit motorists, only a small crowd went to the island to see the finish of the event.

Sunday the visitors were taken on the steamer City of Cleveland through Lake St. Clair and the Flats. Luncheon was served on the boat. Several members of the executive committee, as well as the representatives of The Horseless Age, were unable to take part in these festivities, because the technical examination of the cars was going on at the same time.

#### SOME STATISTICS.

Mr. Hower in recapitulation of the results of former tours made the following statement: In 1907, 98 miles per day average was required; in 1908, 132 miles per day, and this year, 1909, 180 miles per day average will be required. Also Denver and Kansas City have both raised an entertainment fund of about \$15,000.

GLIDDEN TOUR ENTRIES. 1907, 46; 1908, 30; 1909, 21. HOWER CONTEST ENTRIES.

1907, 13; 1908, 14; 1909, 14.
DETROIT CONTEST ENTRIES.
1909, 3.

Non-Contestants. 1907, 6; 1908, 10; 1909, 7.

OFFICIAL CARS.
1907, 5; 1908, 4; 1909, 4.

Total Entries. 1907, 74; 1908, 60; 1909, 46.

#### PARTICIPANTS IN THE GLIDDEN TOUR

#### GLIDDEN TROPHY

CAR No.	Name	ENTRANT	Driver	MECHANIC	OBSERVER	Passenger
1	Premier	H O. Smith	Webb Jay	Edw. Weffler	John Orman	C. S. Ricker
2	Premier	Geo. A. Weidley	H. L. Hammond	W. T. Brown	Edw. Rosenberg	Jack Wade
3	Chalmers-Detroit	Wm. Bolger	Wm. Bolger			
4	Marmon	Frank B. Wing	Frank E. Wing	Joe Dawson	Billy Milton	W. W. Brown
5	Marmon	W. C. Marmon	Howard Marmon	Harry Stillman	Will Milton	M. Davidson
6	Maxwell	B. G. Gager	E. G. Gager	Douglass Moran	F. Hathaway	
7	Jewel	O. H. Bernhart	O. P. Bernhart	J. H. Whitman	A. B. Uhl	Chas. Chittchester
8	Pierce-Arrow	Chas. Clifton	F. S. Day	B. M. Grady	C. M. Babbit	Ed. Westlake
9	Pierce-Arrow	Chas. Clifton	W, F. Winchester	A. A. Lederman		G. M. Davis
10	Glide '	A. Y. Bartholomew	A. Y. Bartholomew	H. L. Kupel	L. C. Wheeler	Richard Radley
11	Thomas	Gus. G. Buse	Gus, G. Buse	C. W. Baton	C. Pearsons	Edw. Buse
13	Midland	A. B. Montgomery	E. O. Hayes	D. E. Thomas	C. B. Wood	T. Smith
14	White	Walter C. White	H. N. Searles	G. Gardell	B. R. Jones	R. H. Johnston
			HOWER TROPH	IY		
100	Moline	W. H. Vandervoort	Chas. H. Vandervoort	D. Beal	Harry Oldefest	•
101	Moline	W. H. Vandervoort	J. A. Wilcox	C. A. Lane	J. G. Reno	
102	Moline	W. H. Vandervoort	W. S. Gregory	F. S. Salisbury	H. C. Kellog	W. F. Vandervoor
108	Brush	Frank Briscoe		•		
104	Brush	Frank Briscoe				
105	Chalmers-Detroit	John Maclusky	John Maclusky			
106	Hupmobile	Frank Steinman	F. A. Steinman		B. A. Nelson	
107	Maxwell	Chas, Goldthwaite	C. E. Goldthwaite		Ed. Hathaway	
108	Pierce-Arrow	Chas. Clifton	John S. Williams	Andy Hattrich	Ned McCurdy	
109	Pierce-Arrow	Chas. Clifton	C. A. Scofield	F. Jungjohann		
110	McIntyre	W. A. McIntyre	Frank Goodman		Gale A. Stevens	
112	Jèwel	O. H. Bernhart	John Shimp	John Rummel	X. D. Johnson	
114	Mason	F. S. Duesenberg	Roy Schneider	C. F. Clayborne	Geo. Means.	F. S. Duesenberg
115	Legington	Fred N. Coates	J. C. Moore	Chas. Blackburn:		V. K. Dodge

#### TECHNICAL DETAILS OF COMPETING CARS.

No.	Name	PRICE	No. CYL.	Borr	STROKE	IGNITION	MAGRETO	CARBURETOR	LUBRICATOR	VALVES	Fan	CLUTCH
1	Premier	\$3600	4	4% in.	5¥ in.	L. T.	Bosch	Schebler	Lavigne	T	Radiator	M. D.
8	Premier	\$3600	4	4% in,	5% in.	L. T.	Bosch	Schebler	Lavigne	T	Radiator	M. D.
8	Chalmers	\$3750	4	5 in.	4¾ in.	H. T.	Bosch	Mayer	Own	r	Radiator	Cone
4	Marmon	<b>#54</b> 00	4	4% in.	4½ in.	H. T.	Bosch	Schebler	Own	T	Radiator	Cone
5	Marmon	\$3400	4	4% in.	4% io.	H. T.	Bosch	Schebler	Own	T	Radiator	Cone
•	Maxwell	\$1750	4	4% in.	4% in.	H, T.	Splitdorf	Own	Manzel	T	Flywheel	M. D.
7	Jewel	\$3000	4	4¾ in.	5 in.	н. т.	Bosch	Schebler	Own	r	Radiator	Cone
8	Pierce	\$5000	•	4% in.	4¾ in.	H. T.	Bosch	Own	Own	T	Radiator	Cone
9	Pierce	\$5000	6	4% in.	4¾ in.	H. T.	Bosch	Own	Own	T	Radiator	Cone
10	Glide	\$2500	4	4¾ in.	5 in.	H. T.	Bisemann	Schebler	Own	_	Radiator	M. D.
11	Thomas	\$6000	6	5% in.	5¾ in.	H. T.	Bosch	Mayer	McCord	Ť	Radiator	Disc
12	Midland	\$2250	4	4½ in.	5% in.	н. т.	Remy	Kingston	Own	_	Radiator	Disc
14	White	\$4000	2	Steam	4½ in.		3 in. x	in. bore			Radiator	
51	Am. Simplex	\$4000	4	5 in.	5 in.	н. т.	Bosch	Own	Lavigne	None	Radiator	M. D.
52	Chalmers	\$2750	4	5 in.	4¾ in.	H. T.	Bosch	Mayer	Own	r	Radiator	Cone
58	Premier	\$2600	4	4½ in,	5¼ in.	н. т.	Bosch	Schebler	Lavigne	T	Radiator	M. D.
100	Moline	\$2500	4	4% in.	5 in.	н. т.	Bosch	Schebler	Hill	_	Radiator	Cone
101	Moline	\$2500	4	416 in.	5 in.	H. T.	Bosch	Schebler	Hill	_	Radiator	Cone
102	Moline	\$2500	4	41/2 in.	5 in.	н. т.	Bosch	Schebler	Hill	_	Radiator	Cone
103	Brush	\$550	1	4 in.	4 in.	H. T.		Own	Own	_		Plan.
104	Brush	\$550	1	4 in.	4 in.	H. T.		Own	Own	_	_	Plan.
105	Chalmers	\$2750	4	5 in.	4¾ in.	Н. Т.	Bosch	Mayer	Own	_	Radiator	Cone
106	Hupmobile	\$750	4	3¾ in.	813 in.	н. т.	Bosch	Breeze	O₩n	_	Flywheel and Rad.	M. D.
107	Maxwell	\$1750	4	4¼ in.	4¼ in.	н. т.	Splitdorf	Own	Manzel	т	Flywheel	M. D.
108	Pierce	\$3850	в	4 in.	4% in.	H. T.	Bosch	Own	Own	т	Radiator	Cone
109	Pierce	<b>\$385</b> 0	6	4 in.	434 in.	H. T.	Bosch	Own	Own	T	Radiator	Cone
110	McIntyre	\$768	2	4½ in.	4¾ in.	H. T.	Remy	Breeze	Manzel	Head	Air cooled	
112	Jewel		Same	as 7								
114	Mason	\$1250	2	5 in.	5 in.	н. т.	Splitdorf	Schebler	Lavigne	Head		
1 15	Lexington Car	\$2500	4	434 in.	5 in.	Н. Т.	Bosch	Schebler	Own	Г	Radiator	Cone
			T-Tee 1	Aotor.	r-Renav	uit Type.	M. DMulti	nle Disc. I	Radiator—Fan b			

#### DETROIT TROPHY

Car No.	Name	Entrant
51	Am. Simplex	W. G. Isbell
52	Chalmers-Detroit	Jean Bemb
53	Premier	H. D. Smith

In addition to the regular competing cars, the following entries of non-contestants were made:

75—Rapid truck.
76—Press car.
77—Diamond Rubber Co.
78—B. F. Goodrich Co.
79—Studebaker, press car.
80—Studebaker, press car.
82—Maxwell, press car.
83—Chalmers, press car.
96—Acme, secretary's car.
97—E. M. F., confetti car.
98—E. M. F., pilot car.
99—Premier, chairman's car.

Nos. 77 and 78 are simply complimentary entries by the tire companies. No cars are being run.

#### OFFICIALS.

Following is a list of the officials of the contest:

#### CONTEST BOARD.

F. B. Hower, Chairman.

S. B. Stevens. T. A. Wright.

	F. G. Webb.
	Secretary and Starter
Dai H. Lewis	Pilot
	Chief Observer
G. A. Fargo	
Geo. R. Rumney	<b>1</b>
W. L. Conklin	
Wm. Carroll ∫	
A. N. Jervis	Publicity
David E. Hoag. N	I. D., New YorkPhysician
Tec	hnical Committee:

Ioseph Tracy. Henry Souther. Owing to the fact that quite a number of the Western towns at which overnight stops are to be made are of only small size and offer only inferior hotel accommodations, it was decided by the committee in charge to make arrangements with the Pullman Palace Car Company for a train of Pullman cars to furnish meals and sleeping accommodation for the tourists at these points. The sleeping and dining cars will be side-tracked at the night stops from Fort Dodge, Ia., to the finish, and will accompany the tour for 101/2 days. Arrangements were made just before the start for six sleeping cars, three dining cars and a headquarters car for the officials and their outfit. Arrangements with individuals on the tour were made only for the complete service, at the rate of \$7.50 per day, which figured out to \$78.23 for each person for the entire number of days, which charge included breakfast, lunch, dinner and lodging. At Council Bluffs a baggage car is to be added to the train, for the accommodation of the tire makers who want to send along supplies. Although the sleeping and dining cars will be used at Council Bluffs, the headquarters will be at the Grand Hotel. The tourists will sleep in the Pullman berths, and will not only get their dinner at night and their breakfast in the morning in the dining cars, but will also receive each day a lunch put up in a box. It might be

# SPECIFICATIONS OF CONTESTING CARS

Car No.	Trans.	Fwd	Drive.	Rear Azle.	Rear Axle. Front Axle.	Foot	Hand	Front	Rear	Tires.	Sise.	1 1	Rim.	Sbock	Speedometer.
		Speeds.				Brake.	Brake.	Spring.	Spring.		Front	Kear.		A DSor Der.	
-	Slid. Sel.	83	Shaft	S. float	1	Exp.	Cont.	S. elli.	% elli.	Diamond	\$ z \$	34 x 4	Ċ O		Warner-Stewart
01	Slid. Sel.	83	Shaft	S. float	1	Exp.	Cont.	S. elli.	X elli.	Goodrich	34 x 4	34 x 4	Ö Ö		Stewart
80	Slid. Sel.	83	Shalt	S. flost	-	Cont.	Exp.	S. elli.	% etti.	Diamond	34 x 4	84 x 4	0	Foster	Warner
*	Slid. Sel.	•	Shaft	F. float	-	Bxp.	Exp.	S. elli.	F. elli.	Diamond	84 z 4%	86 x 4%	O. D.	Hartford	Warner
20	Slid Sel.	••	Shaft	P. float	-	Exp.	Exp.	S. elli.	F. elli	Diamond	34 x 4%	84 x 4%	o O	Hartford	Warner
•	Slid. Prog.	80	Shaft	S. float		Cont.	Erp.	S. elli.	Plat.	Ajax	38 x 4	# # #			Jones
۲	Slid. Sel.	•	Shaft	F. float		Cont.	Exp.	S. elli.	Plat.	Diamond	36 x 4	26 x 4 1/4			Stewart
<b>0</b> 0	Slid. Sel.	4	Shaft	S. float		Cont.	Erp.	S. elli.	X elli.	Goodrich	次+×8	87 x 5	o. 0.	Hartford	Warner
•	Slid, Sel.	•	Shaft	S. float	1	Cont.	Bxp.	S. elli.	S. elli.	Goodrich	86 z 4½	87 x 5	Q. D.	Hartford	Warner
10	Slid. Sel.	•	Shaft	S. float	-	Exp.	Cont.	S. elli.	S. elli.	Goodyear	84 x 4%	34 x 4%	o O		Stewart
=	Slid. Sel.	•	S. ch.	-	-	Cont.	Bxp.	S. elli.	S. elli.	Diamond	36 x 4½	87 x 5%	Q.Q	Hartford	Warner
22	Slid, Sel.	•	Shaft	F. float		Cont.	Exp.	S. elli.	F. elli.	Diamond	36 x 4	36 x 4	Q.Q		Jones
*	Slid. Prog.	•	Shaft	S. float	Tube	Cont.	Exp.	S. elli.	S. elli.	Diamond	36 x 4	36 x 5			Jones
51	Slid. Sel.	<b>8</b> 0	Shaft	S. float	-	Brp.	Exp.	S. elli.	S. etti.	Goodrich	26 x 4	86 x 5	o. D	Hartford	Warner
29	Slid. Sel.	80	Shaft	S. float	1	Brp.	Exp.	S. elli.	% elli.	Diamond	84 x 4	27.78	0. 0	Hartford	Jones
8	Slid Sel.	•	Shaft	S. float	-	Krp.	Cont.	S. elli.	% elli.	Diamond	34 x 4	34 x 4	Ö Ö		Warner-Stewart
100	Slid. Sel.	<b>60</b>	Shaft	S. float	-	Cont.	Exp.	S. elli.	F. efli.	Goodrich	36 x 3%	36 x 4	o o	Hartford	Warner
101	Slid, Sel.	ø	Shaft	S. float	-	Cont.	Exp.	S. elli.	F. elli.	Goodrich	86 x 3%	36 x 4	Ö Ö	Hartford	Warner
100	Slid. Sel.	<b>85</b>	Shaft	S. float	-	Cont.	Erp.	S. elli.	F. elli.	Goodrich	36 x 8%	36 x 4	ο. Ο	Hartford	Warner
103	Plan.	<b>6</b> 2	S. ch.	Tube	Wood	Exp.		Coil	Coil	Ajax	26 x 3	28 x 8		ОМП	Warner
104	Plan.	64	S. ch.	Tube	Wood	Rip.		Coil	Coil	Ajax	28 x 3	26 x 8		Own	Warner
901	Slid. Sel.	m	Shaft	S. float	-	Cont.	Erp.	S. elli.	% elli.	Goodrich	34 x 4	31 x 4		Poster	Warner
901	Slid. Sel.	•	Shaft	S. float	<b>-</b>	Exp.	Exp.	S. elli.	S. elli.	G & J	31 x 3½	31 x 8%			Stowart
101	Slid. Sel.	93	Shaft	S. float	-	Cont.	Exp.	S. elli.	S elli.	Goodrich	34 x 4	31 x 4	Ö		Stewart
106	Slid. Sel.	œ	Shaft	S. float	-	Brp.	Cont.	S. elli.	S. elli.	Goodrich	36 z 4	36 x 4	Ö.	Hartford	Warner
109	Slid, Sel.	•	Shaft	S. float	•	Exp.	Cont.	S. elli.	% elli.	Goodrich	36 x 4	36 x 4	Ö.	Hartford	Warner
110	Plan.	<b>94</b>	Cen. ch.	Solid	Solid	Cont.		F. edii.	F. elli.	Diamond	S6 solid	36 solid	•		Stewart
111	Slid. Sel.	**	Shaft	F. float	-	Cont.	Exp.	S. elli.	S. elli.	Goodrich	36 x 4	87 x 5		Hartford	Warner
112	Plan.	•	Cen. ch.	Tube	-	Exp.	Erp.	S. elli.	F. elli.	Diamond	38 x 8%	88 x 8%		Hartford	Stewart
114	Slid. Sel.		Shaft	F. float	-	Erp.	Erp.	S. elli.	S. elli.	Goodrich	86 x 4%	26 x 4%		Hartford	Stewart



GENERAL VIEW. START OF THE TOUR.

added that nothing was said about the charges for Pullman car accommodations until after the closing of entries, which was probably a wise precaution.

#### TECHNICAL EXAMINATION.

Under the heading of "Penalties," in the rules is found the following clause:

"At the close of the tour each competing car shall be delivered to the technical committee, which shall record all adjustments, replacements and repairs necessary to place each car in a safe and satisfactory operating condition. A card, bearing all details of the technical committee's findings, shall be delivered to the chairman of the contest board, one copy to the operator and one to the observer. The operator and such assistants as he may select shall then proceed to make the specified adjustments, replacements and repairs under constant observation by the observer, and shall be penalized, as hereinhefore provided, for time consumed and material and tools used. For the purposes of this rule the technical committee shall assume that each car was in perfect condition at the start of the contest."

Joseph Tracy and Henry Souther were to act as the technical committee. Unfortunately Henry Souther could not be present, and for a time it was thought there might not be an examination. Later, however, THE HORSELESS AGE representative was appointed a member of the committee protem, During Saturday and Sunday the thirty cars were examined. The examination was very carefully done by Mr. Tracy. The measurements taken were carefully entered on a blank sheet. Only one-half of this blank was filled out in Detroit, the other half will be filled out in Kansas City on the completion of the tour. Saturday Joseph Tracy and the writer made the examinations. On Surday, however, Messrs, E. L. Ferguson and W. C. Reeves came to

our aid and the cars were measured in much quicker time. The measurements take into consideration sag in the frames, flattening of the springs and bending or looseness in the steering gear.

#### WITHDRAWAL OF CARS.

The E-M-F entries were withdrawn and also the Stoddard-Dayton entries. The reason for the withdrawal of the latter was stated to be that it was impossible to prepare the 1910 models soon enough to get them into the tour, the company not desiring to put their old models through the tour. The E-M-F entries will go as non-contestants.

#### SPRING WRAPPINGS AND SHOCK ABSORBERS.

At a meeting Saturday night E, L, Ferguson, the secretary, stated that springs not already wrapped might be wrapped wo cord or tape. Also shock absorbers could applied if the cars were not already equipped. Several of the contestants to advantage of the opportunity and wrapp their springs. It was further added the the condition of the shock absorbers as spring wrappings would be ignored at the finish. This was confirmed by Mr. Howe at the first meeting tonight.

#### FIRST MEETING AT DETROIT.

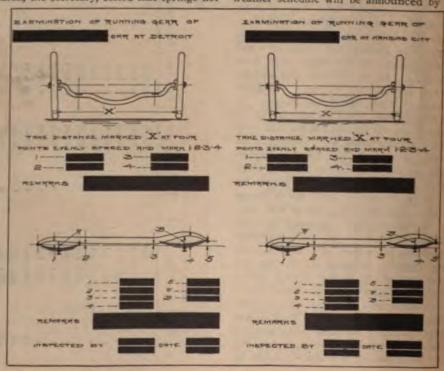
The first meeting took place at 8:30 of Sunday night. It was again stated the broken shock absorbers or windings would not be considered at the finish. Also the no work could be done on these para without penalty for work. However, if the equipment broke it could be removed desing running time without penalization.

Another ruling was that speedometer ould be repaired by the speedometer man at night controls with the chairman's permission. This was considered advisable, it was very necessary to know distances.

Last year penalties were imposed for hising outside aid in filling water, oil and galoline tanks. This year, however, anyone can do it for the driver. In case lamps is similar equipment get loose, no time work penalty is incurred if they are tightened in and the time is made up.

Contestants were advised that shovels are ropes could be purchased when desired, and it was insinuated that they might be needed. On coming to night controls passengers can be dropped before checking in. Likewise passengers can go to the control to standard or be taken up at the hotel, as the entrast desires.

Every night a bulletin will be issued giving the road conditions for the next days run. Also the running time for Class A If the weather is bad, however, the rainy weather schedule will be announced by the





starter. The running time for July 12 was seven hours ten minutes. It is raining, however, and road conditions may require slower time.

#### Detroit to Kalamazoo.

KALAMAZOO, July 12.-Sand, sand, sand was the cry of every one on arriving here after the day's run. The distance was not great, and the country was rolling, with scarcely a hill. On the other hand, it might be said that the cars were climbing a hill continually, so deep was the sand. In places the axles scraped the sand in the centre of the road. The writer was a passenger in H. O. Smith's Premier No. 1, with Webb Jay at the wheel. Except for a leaky valve on one tire the trip was uneventful. At Jackson we pumped it up and finally put in a new tube to save further trouble. This is the first time Webb Jay has driven since the accident to the White which he was driving two years ago. Without question, he is not only an expert driver, but a very careful one. Except for passing two vehicles on hills the entire run of 1423 miles was done on high gear.

We left the paddock at 10:06, being the sixth car to check out. The weather was fine, a little warm, perhaps, but pleasant when riding. It continued so through Jackson, but shortly after leaving there it became overcast. When we neared Cresco we encountered a slight shower, but later it cleared off and the finish was delightful.

The first to miles were over brick and macadam, but as good as these roads were, just as bad were those which followed. Except for a few intervening stretches through towns there were no good roads. The sand was deep, and the holes and ruts countless. Watching another car, one was reminded of the plunging of a boat in a heavy swell.

We passed both Brush entries Nos. 103 and 104, which had started just before us, about 6 miles out. Near Wayne two of the Studebaker press cars, Nos. 79 and 81, were passed. One had tire trouble from appearances and the other had stopped to help. By noon we were at Lima Centre, 49 miles out, and slightly ahead of a 20 mile an hour schedule which had been determined upon. Up to this point nothing had been seen of the three Moline cars, which had started first.

Just as we reached the brick pavement, entering Jackson, an announcer informed us that there was no speed limit, and from the small amount of traffic on the streets, as well as the crowd, it was evident that special provisions had been made for us.

#### LUNCHEON.

As in Detroit, we were royally treated in Jackson. The local chamber of commerce served each contestant with soft drinks and lunches, carefully put up in boxes. There was no doubt that every one was thankful. Gasoline, oil and water were supplied free to all who wished them. Thanks are due to the authorities of Jackson.

Cars Nos. 99, 100, 101, 102, 51, 1, 108, 109, 110, 8, 9, 11 came in within ten minutes. They were all following the chairman closely, and he was averaging about 25 miles an hour. During the afternoon there was a constant passing and repassing of the above cars.

Much interest was shown in the four small cars in the tour, Nos. 103 and 104, the Brush runabouts, 106, a little Hupmobile, and 110, the McIntyre buggy type of car. To the surprise of many the little Hupmobile had no difficulty plowing through the sand and keeping up with the largest company. Indeed, it checked in more than

an hour ahead of schedule. The big cars were a half hour ahead, and the little machine was with them. The Brush runabouts were on time and the only car late was the McIntyre.

Tire troubles were not much in evidence, considering the roads, except when the chairman had to stop for such. He soon had the tour going, however, when he did start. This year Chairman Hower keeps only a short distance ahead of the schedule and as a result little racing can be indulged in. It is very evident that every one is saving his car and not "driving it to death." Except for the McIntyre every car finished on time.

#### At Kalamazoo.

At 8:30 this evening, there was called the usual meeting of drivers and contestants. Among the questions discussed were the following: Several of the observers carried their baggage on the cars which they were coserving. Chairman Hower determined that they must carry it on their own official car.

Also in order to finish in the correct order the chairman requested contestants to use their slates. The finishing time must be chalked upon these at the start in the morning, and no car must overtake another



AWAITING THE START.

Wiles

#### ROUTE AND HOTELS.

		Miles.	
	-Detroit to Kalamazoo		Burdick House,
13-	-Kalamazoo to Chicago	173.3	The Annex.
14-	-Chicago to Madison	175.2	Avenue Hotel.
15-	-Madison to La Crosse	154.4	Stoddard Hotel.
16-	-La Crosse to Minneapolis	177.8	West Hotel.
17-1	18—Remain in Minneapolis		West Hotel.
10-	-Minneapolis to Mankato	132.0	Saulpaugh Hotel.
	-Mankato to Fort Dodge		Pullman.
	-Fort Dodge to Council Blutts		Grand Hotel.
	-Council Bluffs to Kearney		Pullman.
	-Kearney to Julesburg		Pullman.
	-Julesburg to Denver		To be announced.
	26—Remain in Denver		
	-Denver to Hugo		Pullman.
	-Hugo to Oakley		Pullman.
	-Oakley to Salina		Pullman.
	-Salina to Kansas City, Mo		Pullman.
30-	-Same to Kanses City, Mo		- u
	m . 1	446 9	
	Total	,030.8	
Nun	nber of running days, 15. Average miles per day, 175.8.		

on the road which is to finish ahead of it according to the schedule. He also emphasized the fact that he wanted a passing car to "keep-a-going" after passing another car, and not continue to throw dust in their faces. Besides, when a slower car is overtaken by a faster one, the slower must not increase speed, but must pull to one side.

When material is bought on the road a bill of memorandum must be shown by the observer and the driver. In case a fender iron is broken, as happened on one car, a penalty will be imposed for labor alone if a strap or wire carried on the car is used in the repair.

Announcement was made that the Chicago Motor Club would serve a Dutch lunch free, from 7 to 10, on the evening of the 13th. It was also announced that a speed trap was posted on Geoffery avenue. In a message from the Studebaker Company at South Bend it was stated that free lunch and low priced gasoline could be had by contestants. The running time for tomorrow is 8:40 for Class A. The distance is 173.3 miles.

#### PENALTIES.

Car No. 3, Chalmers-Detroit, I point for time required to fix fender and for cost of material used.

Car No. 104, Brush runabout, 6.8 points for a complete connecting rod bearing (to the credit of the little car it should be said that after losing 65 minutes on the road, it finished on time).

Car No. 110, McIntyre, 29 points for tardiness.

Tire troubles were experienced by Cars Nos. 1, 14 and 101. All but the three cars whose penalties are given above had perfect scores.

#### Kalamazoo to Chicago.

The second day's run, Kalamazoo to Chicago, was successfully completed by all of the thirty cars. The contestants were fêted both en route and upon their arrival in Chicago. When arriving in the latter city they were warned not to exceed a speed of 15 miles per hour on the boulevards. A detailed report of this day's run will appear in our next week's issue.

# Detroit Meeting of the A. A. A. Executive Committee.

At the monthly meeting of the executive committee of the American Automobile Association held on the morning of July 10 at the Hotel Pontchartrain, Detroit, the Wyoming State Automobile Association was elected to membership, thereby giving the A. A. A. its thirty-first affiliated State body.

President Louis R. Speare, of Boston, presided at the meeting. James R. Jackson, of Grand Rapids, Mich., and Col. W. D. Schier, of the Massachusetts State Highway Commission, were elected to membership on the good roads board, upon the nomination of Chairman Diehl.

A resolution was adopted conveying a vote of thanks to the Government officials who had extended courtesies to Chairman Evans of the touring information board, who is now in London attending the congress of the Ligue Internationale des Associations Tourists, which comprises all of the great automobile touring organizations of the world.

A membership committee of three, including Secretary Elliott, was authorized to investigate and approve of applications for individual membership, as well as applications of automobile clubs originating in States wherein there is no affiliated State body.

A vote of thanks was extended to the Detroit Automobile Dealers' Association and to the Automobile Club of Detroit for the entertainment provided for the association's officials and directors.

#### Huber Has New Small Car.

Emil Huber, of Davenport, Ia., was in Detroit at the start of the Glidden Tour, driving a small car of his own design. Mr. Huber has recently left the employ of 'the Meteor Motor Car Company, and expects to form a company in Davenport for the manufacture of his new runabout. The car has a four cylinder "block" motor, 'underslung frame, rather large wheels and a wheel base of 100 inches.

#### American Darracq Agency.

Henry Ducasse & Co., who recently acquired the American agency for the automobiles manufactured by A. Darracq & Cie., of Surennes, France, have opened an office at 737 Seventh avenue, corner of Forty-ninth street, New York city. They have established sub-agencies in Chicago, Boston. San Francisco, Washington, D. C., and Huntington, W. Va. They also have the Canadian agency for Darracq taxicabs. At present Messrs. Ducasse & Co. are devoting most of their attention to taxicabs, but they will shortly import pleasure cars and commercial vehicles also.

#### Foreign Notes.

According to a recent decision of the Belgian customs authorities, graphite grease intended for the lubrication of vehicle chains, put up in small steel cans, is dutiable as hardware at 13 per cent. ad valorem.

The output of rubber from the three rubber producing states of the Federated Malay States shows an increase of 60 per cent. for the first four months of the year 1909. The output was 1,577,325 pounds, as compared with 965,180 pounds for the corresponding period in 1908, an increase of 612,145 pounds.

No hill climb was held in connection with the Prince Henry Tour this year, because it has been found that in a drive up a serpentine mountain road (which sort of course was always selected in former years) the skill and daring of the driver is a much more important factor than the qualities of the vehicle.

It is reported that the French tire manufacturers, who are now members of three different trade organizations, are planning to join in a new Chambre Syndicale, an organizing meeting having been called at Paris for a recent date. It is rumored that the chief object of the organization is to pave the way for an increase in the prices of tires.

According to a recent ministerial order issued in New Zealand belt rims for motorcycles are dutiable at 20 per cent. when coming from any part of the British Empire and at 30 per cent. when coming from any other part of the world. Detached wheels for motorcycles are duty free when coming from any part of the British Empire and subject to a duty of 20 per cent. when from any other part of the world.

According to a recent consular report the importation of automobiles and motorcycles in British East India increased considerably during the fiscal year 1907-8. They are classed under the heading of wagons and vehicles. The imports under this heading during the year 1907-8 amounted in value to 1,595,000 rupees, as compared with 1,053,000 rupees the previous year. The bulk of automobile imports into India comes from Great Britain.

# The Horseless Age

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Kalamazoo

#### The Sixth Annual A. A. A. Reliability Tour-II.

By CHESTER S. RICKER.

#### Kalamazoo to Chicago.

CHICAGO, July 13.-To-day's run was accompanied by the same pleasant-though warm-weather which we enjoyed on the first day of the tour. It was the first day that any competing cars met with trouble sufficiently severe in nature to likely entail their elimination. The day's run was the longest so far, being 173.3 miles in length.

At 6:40 o'clock a. m. the chairman's car started, and 20 minutes later, exactly at 7, we left Kalamazoo. The writer again occupied a seat in the Premier car No. 1, which was driven by Webb Jay. Up to South Bend, 70 miles, our car led the way, and the run was delightful, especially as we did not have to take any one's dust. We were delayed somewhat in getting oil and water at South Bend, and in consequence were passed there by a number of

After leaving Kalamazoo we passed over about 30 miles of excellent dirt road, and had no difficulty in making this distance in one hour and fifteen minutes. From there on for about 20 miles the roads were an abomination, but fortunately they improved as we neared South Bend. After leaving South Bend, where the lunch stop was made, the roads steadily grew worse, until at Westville they were almost dangerous. To make things worse, the chairman stopped to try to extricate the Firestone truck which had become ditched a short distance before Westville. From there to the city limits of Chicago the roads were for the most part macadamized and in good condition, except for a half dozen miles,

where they were the roughest yet encountered. The dust finally became almost unbearable, but we had to stand it just the same. Almost three-quarters of the entire distance of the day's run was over improved gravel roads, and the average of the roads for the day was somewhat better than that of the previous day's route.

Chicago LAKE MICHIGAN KINDIANA STVILLE

The chairman held up the tour twice during the day. The first time he tried to help get the Rapid truck on to the road again, as it had gotten into a ditch in a swampy place. The second stop was made to replace a tire, and lasted only a few moments.

Some of the observers were much disgruntled by a ruling to the effect that every observer should change cars every night, and in the course of time serve on the cars of all the different entrants except the one who had nominated him. This was not satisfactory to the observers of the cars entered by the Pierce, Premier and other companies. The ruling was therefore changed so that the observers nominated by an entrant in the contest for one of the trophies need observe only on cars competing for that trophy. Thus, an observer nominated by an entrant of a Pierce car. in the Glidden Contest, for instance, need not observe on a Brush car competing for the Hower Trophy. This change in rules was announced by M. C. Reeves, the chief

At 7 o'clock to-night cars Nos. 104

(Brush) and 110 (McIntyre) had not yet arrived. Those reported as having had tire troubles were Nos. 5, 11 and 12. Cars Nos. 5 and 12 changed tires during running time, which is contrary to the usual practice. Car No. 3 (Chalmers-Detroit) had further trouble with its fender iron and stopped again to strap it more securely. As a result it incurred additional penalties, making the total number of points against it 1.4. Car No. 103 (Brush) lost 0.4 point for tightening up a loose front wheel bearing. The speed required is very high for the little cars and that they hold together is surprising. On this score the Hupmobile has already risen high in the estimation of the drivers of the large cars, as it keeps right up with these cars.

The Studebaker Company served an excellent lunch at South Bend, and supplied the contestants with oil and gasoline at





THE MARMON CONTINGENT,

AT THE START IN DETROIT.

THE JEWEL.



THE E-M-F PILOT WITH THE CONFETTL

moderate prices; it also provided water for those who wanted to replenish the supply in their radiators.

No official meeting was held in the evening, and this enabled the contestants to attend the pleasant affair referred to as a Dutch Lunch which the Chicago Motor Club had arranged in honor of the event. Besides serving an excellent lunch, the club gave an exhibition of moving pictures of the "Cobe Trophy Race."

So far the hotel accommodations have been very satisfactory, and not a word of adverse criticism has been heard. Glen A. Fargo and Geo. R. Rumney have full charge of both hotel and Pullman reservations.

Car No. 104 (Brush) finally arrived about 8 o'clock, and toward 11:30 the Mc-Intyre car, No. 110, put in an appearance. The writer was unable to find out what caused the delay of the Brush, but got a chance to interview the driver of the Mc-Intyre. His rear spring hanger broke at Decatur, Ind., and it took some hours to make a repair. After dark, he lost his road and in consequence was delayed considerably longer. Every one admired the grit shown by the drivers of the little cars. The running time for Class A for this day was 8 hours 40 minutes. For to-morrow, in the run to Madison, Wis., the time allowed for cars in Class A will be 8 hours 50 minutes. This class comprises cars listed at \$3,751 and upward. According to the rules, the time allowed for Class B (\$2,451-3,750) each day will exceed that of Class A by 10 minutes if the time for Class A is 71/2 hours or less; 15 minutes if the time for Class A is between 71/2 to 9 hours, and 20 minutes if the time for Class A is 9 hours or more. Similarly, the running time for cars in

Class C (\$1,751-\$2,450) will exceed that of Class A by 20, 30 and 40 minutes respectively; that of Class D (\$1,000-\$1,750) will exceed the time of Class A by 30, 45 and 60 minutes respectively, and that of Class E (less than \$1,000) will exceed the time of Class A by 40, 60 and 80 minutes respectively. The distance to Madison, Wis., is practically the same as that from Kalamazoo to Chicago, but the roads are said to be not so good.

The strain of riding all day, covering a distance of 200 miles, then getting to bed at 11 or 12 o'clock and up again at 4:30 to 5 in the morning is already making itself felt

Chicago to Madison, Wis.

Madison, Wis., July 14.-Today's run was the best we have had so far, and will probably not be equaled again for some time to come. The roads, of course, had much to do with this. So far as the large cars are concerned, the run was eventless, none of the big machines having incurred a single penalization. The smaller machines, however, have begun to feel the strain of the successive long daily drives. Car No. 110, the McIntyre motor buggy, had to drop out today. No. 104 (Brush), which was late at the night controls of the first two stages, did not turn up tonight. Car No. 106, the Hupmobile, is doing excellent work, invariably arriving at the night controls along with the large cars. Car No. 103, the other Brush runabout, also came in on time and apparently without trouble. Only cars 106 and 12 had tire trouble.

The penalizations of the Brush No. 104 and the McIntyre No. 110 up to July 13 were announced today. The McIntyre

broke a rear spring bracket and was penalized 423.7 points for lateness and 18.7 points for work. The Brush No. 104 lost 179.3 points for lateness and work combined. The bearing which gave trouble on the first day proved troublesome again on the second day, it was stated.

The running time for the third stage, from Chicago to Madison, was eight hours and fifty minutes for Class A cars. which did not call for any great efforts, considering the condition of the roads. The first 40 miles out of Chicago were macadam roads, which were oiled in many places, making them very pleasant to ride over. However, the speed regulations of the numerous towns passed through made it impossible to take advantage of these fine roads, and this continued all the way to Milwaukee. Except for a few hills near Evanston the roads were level all the way to Milwaukee. On our arrival there we were treated to an excellent lunch. Nowhere have we had such a pleasant noon stop, nor have we yet been more hospitably received than in this city. Gasoline was supplied free to all of the contestants, as was done at Jackson, Mich., on the first day of the tour. Most of the cars arrived at the noon stop behind schedule time, which indicated that the drivers were not taking any chances with the authorities, but af ter leaving the noon stop most of them kept up to the schedule for the next 30 or 40 miles.

Our day's run was 175.2 miles and necessitated an average speed of 19.6 miles per hour. Contrary to what occurred in the tours in former years, there has been practically no racing so far. Few of the cars ever get more than three-quarters of an hour ahead of running time, and this only to have time to take on gaso line and oil up before checking in at night. The driver of our car, Premier No. 1, has not experienced the least trouble in passing any car he desired. All that was necessary to do was to show the slate having our official finishing time chalked upon it, and in every instance the preceding car would allow us to pass immediately. Some of the entrants have already begun to realize that unless they know what class a car is in it is not good policy to follow it, because if the preceding car happens to be in a slower class they will soon find themselves behind the schedule.

The weather today was excellent. Although the sun was out it was somewhat overcast at times; and, besides, the greater part of the route was lined with trees, thus protecting the tourists from the direct heat of the sun. On the road to Milwaukee the juvenile element was extremely enthusiastic, but the older people did not show any particular signs of interest. Here and there some autoists had pulled up at cross roads.

After leaving Milwaukee the nature of the country, the roads and the people seemed to change abruptly. The roads were fine, although mostly made of dirt and clay. The route led through a beautiful farming region, and many summer hotels were passed, situated on the many lakes bordering the route between Milwaukee and the State capital. The cross roads were lined with farmers, and local motorists and town residents were out in

morning, and Mr. Hower recommended that each driver meet his observer on the previous evening. Another point to which attention was called was that all cars must check out at the parking station, and only there. The announcement made at Kalamazoo, that observers must not carry their baggage in the car to which they are assigned, was repeated here. There have

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full. At Marshall several girls handed out bouquets to the contestants.

Upon looking over the cars in the control upon our arrival in Madison the effects of the 490.8 miles traversed so far were hardly noticeable. The springs used on the cars seemed to be quite sufficient for the task imposed upon them, and no evidences of weakened springs could be found. One or two trunk racks are beginning to show the results of the strenuous work. Mudguard brackets have given trouble in two instances, the first car to suffer in this respect being No. 3, Chalmers-Detroit, and on today's run Car No. 12, Midland, had the same trouble. Neither car was penalized, however, as no work was done on the brackets. Car No. 103, Brush runabout, and No. 106, Hupmobile, had sprung leaks in their gasoline tanks. The latter seemed to have a leak in its radiator also. The perfect scores up to date are as follows.

Glidden Contest—Cars Nos. 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 14.

Hower Contest—Cars Nos. 100, 101, 102, 105,

Hower Contest—Cars Nos. 100, 101, 102, 105, 206, 107, 108, 109, 111, 112 and 114.

Detroit Trophy Contest-Cars Nos. 51, 52 and

The results of the tour so far establish a new record; that is, in no former contest have 86 per cent. of the cars come through the first 500 miles with perfect scores, and 93 per cent. in all.

#### At Madison.

No meeting was held at Chicago last night, so as to give the contestants a chance to attend the festivities provided by the Chicago Motor Club. The meeting this evening was short and to the point, and thoroughly characteristic of Chairman Hower. He scored the press cars for trying to cover both ends of the tour and all the space in between, they running by contestants with their mufflers cut out and at high speed. He especially emphasized the fact that he wanted the drivers to keep their muffler cutouts closed in passing through towns. He also insisted that the occupants of the cars should not throw any matches to the sides of the roads, as fires had been started in that way and complaints about the matter had come to him. The drivers were warned that they were responsible for getting their observers each

been frequent complaints by observers that the tonneaus in which they are required to ride are overloaded and that it is impossible for them to put their feet on the floor and to ride comfortably. Chairman Hower, therefore, ruled that in future sufficient space must be provided in the tonneaus to allow of the observers riding comfortably. Several complaints had also been made that drivers of cars, when others were trying to overtake them, increased their speed, and the chairman warned the contestants not to do this. He also said that some of the drivers seemed not to know which side of the road to take when others wanted to pass them.

At the close of the meeting the running time for tomorrow's run was announced as seven hours forty-two minutes for Class A. It was announced this evening that the McIntyre car, No. 110, had broken a wheel, and had therefore the full 1,000 points penalty imposed upon it; in other words, it was disqualified.

#### Madison to La Crosse.

LA CROSSE, Wis., July 15.—Today's run was marked by the worst roads which have been met with up to date. The first part of the day's route, immediately after leaving Madison, was comparatively good, and a fair speed was maintained by all the drivers. However, after leaving Baraboo, 42 miles out, the conditions changed slowly for the worse, the roads becoming exceedingly sandy, and at 79 miles we had to leave the main road and go through a grass grown lane. At the end of this lane came a hill which was so steep that many contestants doubted whether they could have climbed it if that had been required. Luckily for them, they had only to descend it. It, however, was only a sample

of the hills which we did have to go up. In two cases we passed over hills which the railway had tunneled through. So steen and rough were the roads that two cars were stalled and the entire caravan blocked. The time lost by the delay of necessity had to be made up, and with the very dangerous and rough roads following it was a miracle that any of the cars arrived on time. Scores. however, could not be announced, because the starter, Secretary E. L. Ferguson, was delayed. The reason for his delay was said to be that a child jumped into the road, and in order to save the child it was necessary to ditch the car. A front spring was broken and the front axle bent. Nothing further as to his whereabouts was heard up to midnight.

For four days now we have had perfect weather. Rain would have been very agreeable to the tourists this morning, as it would have laid the dust and made traveling a pleasure instead of a dust devouring trip. A shower did fall early this morning, but it was merely local, there having been no rain 6 or 7 miles out of town.

#### ALONG THE ROAD.

With such rocky and steep hills, abounding with water breakers, it is a wonder that many springs were not broken, and that tire troubles were not more prevalent. As on all previous days, the tourists struck a steady pace, which was little, if at all, faster than the schedule called for. As a result everyone lost still more time when the hills and rougher roads were met. As soon as these had been passed, about 30 miles from La Crosse, the contestants began to speed. The old racing spirit seemed to be rampant again, but it was a matter of necessity rather than of choice. Many of the cars did the 56 miles from the first bad hill to La Crosse in two hours, and this over roads which for 15 or 18 miles were beyond description, there being water bars every 50 feet or so, which, as our driver put it, were a yard wide and a yard high. About 5 miles from La Crosse. P. O. Bernhardt driving the big Jewel touring car No. 7, in the endeavor to make up time, took a turn so fast that the front tire was torn off, and Bernhardt finished the run into La Crosse on the rim. He had lost all his tools on the road and could not have changed the tire if he had wished to do so.

About 12 miles out of Madison the writer passed the Brush runabout No. 104, driven by Huss, with its hood off and the driver working on the motor. On the first long hill over the railroad tunnels Jewel No. 7, in trying to pass the Lexington No. 114, was stalled, and since the road was too narrow to permit passing, all the cars following were held up. More than twenty minutes were lost by this delay, which added still further to the necessity of racing.

SMALL CARS.

There was little expectation that the small cars would survive today's run. It is true that they suffered and were late, yet they

came through. The little Brush, No. 103, has always come in with the bunch, and usually only a little late. Today it did the same. The No. 104, Brush, driven by Huss, came in about 8 o'clock. The trouble was the same as that which caused delay on previous days, the crank pin bearing having to be rescraped. On the first day out Huss lost the scoop which is attached to the lower half of the connecting rod bearing and as a result no oil could reach this bearing. When the trouble was discovered the crank pin was badly scored. Since then Huss has smoothed the pin with emery cloth as best he could, and repeatedly scraped the bearing. As a result the car is doing better now than when it left Detroit.

Much regret was expressed at the nonarrival of No. 106, the Hupmobile driven by F. A. Stineman. The little car had a perfect score so far and was always in along with the big cars, although its schedule did not require it. Today it did not arrive until 10:10 p. m., and from all indications will not continue. THE HORSELESS Age representative was told by Stineman that the chief difficulty was the leaky radiator, which allowed the motor to overheat. During the day the clutch also stuck, and it was necessary to use the throttle and clash the gears when it was desired to change speeds. That the car got through under such conditions was remarkable. It will probably be withdrawn, and after a new low speed gear is installed and the clutch repaired the car may continue as a non-contestant.

#### OPINIONS ON DAY'S RUN.

Dai H. Lewis, in speaking with the writer, stated that he had never passed over such roads in his long experience as a path-

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ner of the trophy would be determined by ballot.

#### CONDITIONS OF THE CARS.

Remarkable to say, there seems to be almost no trouble of consequence with the cars. The Midland had some trouble with its sod pan striking, so it was reported. Some difficulty was experienced by one of the Pierces in shifting gears, as an observer told the writer. Except for the breaking of a spring on the Acme No. 96, due to ditching, no spring troubles have been noticed. The Studebaker press car, when it was passed in Elroy, had a bolt out of the front wheel hub flange. The driver was endeavoring to put in a substitute. During the evening it was heard that he had broken this front wheel on a sandy road.

#### NO REPORTS.

As a result of the accident to the secretary's car and his non-arrival, no scores could be announced this evening. Nor was there a meeting of the contestants, as they were all so exhausted and only too glad to retire early. Up to date only the McIntyre No. 110 has been withdrawn. Car No. 106 (Hupmobile) will probably be withdrawn tomorrow.

Tire troubles were experienced today by cars Nos. 1, 11, 105, 111 and 114. Considering the road surfaces the cars were driven over the small number of tire troubles was astounding, but tomorrow will probably show the effects on the tires of the run today.

RUNNING TIME FOR TODAY.

Class A—7 hours, 42 minutes.

Class B—7 hours, 57 minutes.

Class C—8 hours, 12 minutes.

Class D—8 hours, 27 minutes.

Class E—8 hours, 42 minutes.

The distance was 154.4 miles.

La Crosse to Minneapolis. •
MINNEAPOLIS, July 16.—Another pleasant day greeted the tourists, and well might

finder and Glidden pilot. The pilot car was about an hour late, and it was thought by all that not a car would get through on time. When Dai H. Lewis went through on the pathfinding trip he took six days to make the run for which we were given seven hours forty-two minutes. It remained for the contesting scars to show how stanch and reliable American cars can be made.

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they be pleased, for had it been muddy it might have been a harder task than yesterday's run. The roads, although composed of dirt and clay, were free from the chuck holes which were found on the improved roads around Chicago. They were hard and smooth and made good running.

Today was the first day which in any

measure partook of the former Glidden Tour character. Every one profited by vesterday's experience and began to "burn up" the road from the start, so that in case bad roads were met later they could be taken with consideration. They were not encountered, however, and so the whole group of early starters arrived in Minneapolis right behind the pacemaker. As a result they were over an hour ahead of time. The Premier car, No. 1, in which the writer is riding, checked out first, and at Rochester came upon the chairman. stopped for lunch. When he started we followed just behind, and indeed stayed behind him all the way to the city.

The route led through the most beautiful country we have seen. During the morning we passed through some beautiful valleys, one just after leaving La Crosse and another after leaving Winona. Except for these two hills the roads led across the top of the hills and through miles and miles of beautiful fields of wheat. The views from the hills were magnificent.

ON THE ROAD.

The E-M-F confetti car was the first one to come to grief today. The roads were so smooth that the driver had almost forgotten that water breaks existed. About 118 miles out the car struck one, and before the driver, R. J. May, realized the whole car and party were in a wheat field. W. L. Conklin, who was distributing the confetti, was thrown from the car and had his ankle sprained. A rear spring was broken and the whole party was well scared. They continued, however, and finished in good time.

Scarcely anyone experienced trouble, except with tires. The only penalization announced was to Car III, the Jewel roadster. The air pump which raises the gasoline had to be worked on, and as a result the car was penalized for labor.

Many of the passengers were able to get a nap, the roads being so smooth, and the majority were in need of it, too.

#### AT NOON STOPS.

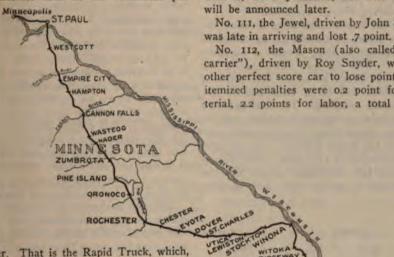
It is interesting to watch the contestants on their arrival at noon stops. As each car arrives there is a rush by the passenger for something to eat, both for the driver and himself. The observer is kept busy watching the oiling up of the motor by the driver, which is usually done at this time. The mechanic rushes for a supply of gasoline and endeavors to fill up the gasoline tank in half the time it really takes. Oil is poured into the crank case and lubricators, while someone else fills up the radiator. It is a mad rush, especially if the contestant happens to be behind his schedule. If not, he hurries in order to get away before those following, soas not to have to take their dust.

All the cars carry at least one Thermos bottle, and some more. Some prefer cold drinks and others hot. The usual lunch is a sandwich, if anything. Yesterday hardly any of the drivers stopped for anything to eat—they were so far behind their

ng time. Beer is the staple beverwhich is handed to tourists as they through towns. Most of the drivers ery abstemious, however.

THE RAPID TRUCK.

of the non-contestants is arousing interest than all the remainder put



er. That is the Rapid Truck, which, ng air bottles and tires, has been to make every day's run and has by earned much favorable comment. crew start early in the morning and y finish early in the evening, often dark. If the truck reaches Kansas and from all present indications it the manufacturers may well feel of its performance.

ENTHUSIASM ALONG THE ROUTE.

re genuine enthusiasm was shown tothan we have experienced before. village turned out in full to welcome ers. Groups of girls lined the roads tossed bouquets of flowers into the as they passed. The Western atmosof hospitality and good fellowship oming more and more evident as we arther West.

THURSDAY'S PENALTIES.

terday, as the secretary could not get Crosse during the evening, no anement was made with respect to the Indeed, Mr. Ferguson did not arantil 5 o'clock this morning. He exd that, besides having a broken they had lost their road several and traveled 40 or 50 miles farther. ing many side trips. The announcewas made this evening in Minne-

12, the Midland, driven by E. O. s, was penalized 3.7 points. The penvas divided into 0.6 point for material, meant a strap to lash the loose mud to the car, and 3.1 points as a time ty for time spent in fastening the and fixing the rod pan, which I unnd was struck by thank-ye-marms during the day's run.

104, the Brush, driven by Huss, was zed 343.9 points for late arrival and required by work on the crank pin, tightening a rear wheel bearing.

106, the little Hupmobile, driven by

Stineman, was late in arriving and was penalized 358 points. As the writer stated yesterday the Hupmobile will probably continue as a non-contestant.

No. 107, the Maxwell, driven by Goldthwaite, and No. 103, the Brush, driven by Trinkle, were penalized, but their scores

No. 111, the Jewel, driven by John Shimp,

No. 112, the Mason (also called "hod carrier"), driven by Roy Snyder, was another perfect score car to lose points. Its itemized penalties were 0.2 point for material, 2.2 points for labor, a total of 2.4

points. The trouble was with a pet cock in the cylinder, which broke and in consequence no power could be obtained. The driver showed great familiarity with his car, for he removed a radiator pet cock which would fit the cylinder and replaced the original. When the car arrived it was running excellently.

La Crosse

#### SCORES ON JULY 16.

Today few points were lost. The unfortunate were as follows:

No. 111, the Jewel, was penalized 0.2 point for material, 3.8 points for outside labor, and 2 points for driver's work, making a total of 6 points lost.

No. 106, the Hupmobile, driven by Stineman, was withdrawn, much to the regret of the contestants, as all the big car men were greatly impressed by the manner with which the little car had stood the gruelling

No. 109, no observer's card.

Nos. 103 and 104 were not in when scores were announced.

No meeting was held this evening.

RUNNING TIME OF THE CLASSES.

hours, 57 minutes, hours, 12 minutes, hours, 27 minutes.

#### Saturday at Minneapolis.

MINNEAPOLIS, Minn., July 17 .- The contestants in the tour, drivers, mechanics and observers, today enjoyed a well earned rest. During the forenoon they went on a trolley ride to Minnehaha Falls, and later they visited Fort Snelling, escorted by members of the Minneapolis A. C. At the fort a dress parade of the infantry, cavalry and mounted artillery troops was held, after which a reception was tendered the visitors at the officers' club. In the afternoon many of the tourists attended a horse race which was on the program among the entertainments. During the evening an automobile parade took place in which about 300 cars took part, many of them tastefully decorated. Following the parade there was an informal supper at one of the city's best known

Tomorrow the tourists will be taken to Lake Minnetonka, Dinner will be served at the Tonka Bay Hotel, and in the afternoon cars will take the men to the Automobile Country Club. The start from Minneapolis will not be made until eight o'clock on Monday morning, to allow the people of the city an opportunity to see the cars cross the line.

A new automobile cab company has been organized in Vienna, Austria, with a capital stock of \$150,000, and an order for 100 cabs has been placed with Laurin & Klement in Jungbunzlau, Bohemia. It is planned to begin the operation of the cabs this fall.



MAXWELL DRIVEN BY E. G. GRAGER PASSING THROUGH ELROY, WIS.

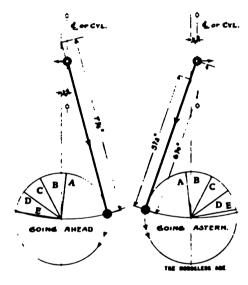
#### Tests to Determine Results Due to Offsetting Cylinders.

By JAMES McIntosh.

The offsetting of gasoline motor cylinders has been repeatedly discussed in the technical press, but I have failed to notice any instances of results of actual tests on the subject being published. I happened to be in a position to test the advantage gained by offsetting, and made a series of tests for my own benefit, the results of which may interest the readers of THE HORSELESS AGE. The tests were made on a single cylinder marine engine of the two cycle, three port, reversible type. In order to get uniform results I fitted the engine to run with natural gas, and with the spark set at D regulated the mixture to give the maximum speed obtainable with that spark adjustment, after I had warmed up the engine, regulated the flow of water to the jacket, and adjusted the cylinder oiler. For further precaution I started off with the spark set at A, the engine turning forward; then, with the spark still at A, I reversed the engine; then I moved the spark to B, keeping the engine turning in the reverse direction, then reversed it again so as to make it turn forward, with the spark still at B. In this way I continued until the end of the test had been reached, which was run without a stop from start to finish. The conditions at the moments of the various observations were, therefore, as nearly equal as possible, and the difference in the speed ahead and astern with the same spark lead will be twice the advantage gained by offsetting the cylinder, over an engine without off-

The engine here tested had only a 1/4 inch offset, the reason for making the offset so small being that the engine has to be reversed, which is not required in an automobile engine. The latter can be, and often is, offset much more, in order to reduce the side thrust of the piston on the impulse stroke, due to the angularity of the connecting rod. In my case the object sought was not so much to reduce the side thrust as to reduce the crank case volume and to ensure a low centre of gravity, the result of a shorter cylinder. By referring to the accompanying sketch it will be seen that with a connecting rod measuring 61/4 inches from centre to centre I have the same angularity as with a connecting rod measuring 71/4 inches from centre to centre in an engine without offset. This makes a gain of 1 inch in the length of the connecting rod, and the engine is, of course, correspondingly lower. On the other hand, when the engine is reversed the angularity of the connecting rod is the same as with the 51/2 inch rod in an engine without offset. While this angularity may appear to be excessive, I have not experienced any bad effects from this cause. In this connection it must, of course, be taken into account that the engine turns in the reverse direction only a very small portion of the time, and the advantage gained by offsetting while the engine is running ahead, owing to the reduced crank case volume and engine height, far outweighs any disadvantage due to the same cause during reverse operation.

It might also be interesting to know the relative values of natural gas as compared with gasoline as fuel. I made a comparative test with the two fuels, noting the maximum speeds at which they drove a two bladed fan direct connected to the crank shaft coupling. The fan had two radial blades measuring 63 inches over the tips, the blades being 10 inches wide radially and 3½ inches laterally. The fan arm had a thickness of 1½ inches. With natural gas as a fuel the engine would turn the fan at 830 r. p. m., while with gasoline



SPARE POSITIONS.

The spark positions given below represent the instant the contact is made at the commutator or when the spark coil vibrator starts to act.

A—Spark three-quarters inch late on 13 inch cir-

cle.

B—S; ark at dead centre on 13 inch circle.

C—S; ark 3 inches early on 13 inch circle.

D—Spark 6 inches early on 13 inch circle.

E-Spark o inches early on 13 inch circle.

MAXIMUM SPEEDS FOR DIFFERENT SPARK POSITIONS.

GOING AMEAD.	GOING ASTERN.
R. P. M.	R. P. M.
Spark at A 310	Spark at A 289
Spark at B 375	Spark at B 324
Spark at C 610	Spark at C 570
Spark at D 748	Spark at D 715
Spark at E 830	Spark at E 786

as fuel a speed of 1,100 r. p. m. was obtained. The difference in the horse power obtained with natural gas and gasoline, respectively, was, however, hardly a fair measure of the difference in the fuel value of the two fuels, for the reason that when the natural gas was used the charge was drawn through a spring controlled check valve, so that the opening was somewhat restricted, while the passage through the gasoline carburetor was large, which would naturally increase the speed.

In the comparative tests to determine the speeds of the motor turning ahead and astern respectively, I neglected the slight difference in the timing of the opening and closing of the ports resulting from the offsetting of the cylinders, and only considered actual speeds obtained for the different spark positions.

In conclusion. I consider that the advantages gained by offsetting cylinders are quite desirable, and where the engine is to be used in an automobile, where it is not to be reversed, a still more marked gain can be secured by employing a greater offset. However, where an engine is sold as reversible, it is well to limit the amount of offset, as serious damage might result during the reverse operation from excessive side thrust. Not only that, but the engine is harder to control when changing from reverse to forward operation, and is liable to cause trouble if care is not taken.

The tests were made on a single cylinder motor of 3¾ inch cylinder bore by 3½ inch piston stroke, having a connecting rod measuring 6¼ inches from centre to centre.

#### Fiat Decides on Poughkeepsie.

The Fiat Automobile Company has finally decided to locate its American branch factory in Poughkeepsie, N. Y. They have there obtained a site comprising about 30 acres, situated directly on the old Albany post road and only about 500 feet away from the Hudson River. The location was decided upon after considering offers from nearly 300 other points. The city of Poughkeepsie offered a private dock to become the perpetual property of the Fiat Company. This will enable them to make shipments by boat to New York and other points. Another inducement offered was the construction of a spur from the main feeder of the seven railroad trunk lines passing through or near Poughkeepsie. The site selected is in the northern part of the city and within twelve minutes' walking distance of the centre. An extension is to be made of the local electric railway as far as the new plant for the convenience of employees.

The parent Fiat Company, of Turin, Italy, will send their chief engineer, Chevalier Guido Fornaca, to this country during six months of each year to superintend the construction of the new models. In addition Engineer Marigny will be permanently located at the Poughkeepsie factory. Chevalier Giovanni Agnelli, the founder, and Ing. Enrico Marchesi, the commercial director, of the Fiat Company will make prolonged annual visits to the American plant. Albert E. Schaaf, who has long been connected with the American automobile industry, will be manager of the plant. Mr. Schaaf recently returned from a visit to the Turin works, where he studied the details of the organization and the manufacturing methods. It is hoped to be able to deliver the first cars from the American works in June or July of next year. Plans for the factory have been prepared, and it is expected that it will be ready for occupancy by the end of the year.

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#### Mr. Hower's Speech.

Chairman Hower, of the A. A. A. Tour, is naturally disappointed that the tour this year is receiving such slight support from the manufacturers, but in venting this disappointment at the banquet given to A. A. A. directors in Detroit previous to the start he used rather ill chosen arguments.

One of the most significant—and, in our opinion, most fallacious—statements made by Mr. Hower was the following: "We must keep up the sporting end of the industry if we wish to maintain the industry itself." In other words, Mr. Hower holds that the automobile industry has no other foundation than the automobile sport. The future of the industry would, indeed, hold out little promise if this were true—if the sale of automobiles depended solely upon the interest of the public in races, hill climbs, endurance trials, etc.

Recently comparisons have repeatedly been made between the bicycle industry and the automobile industry, and the view has invariably been expressed that the latter would never meet with such a severe reverse as the former did. Although the line of argument has seldom been very clear, we

take it that the conclusion is based mainly on the well founded assumption that the field of useful application of the automobile is wider than that of the bicycle. As to the sport, there can be no manner of doubt that automobile contests in the course of a few years will be as extinct as the bicycle sport is now. There may still be "a match pulled off" here and there, and a few of the sportively inclined may risk their shekels on its outcome, but the great body of the public will be entirely unmoved by such events. If, as Mr. Hower asserts, we can only maintain the automobile industry by keeping up the sporting end, the industry would be doomed to an early demise. It will simply be impossible to keep up the sporting end, the public being altogether too fickle in its attachment to different sports.

The use of automobiles for pleasure driving is not sport. No one would maintain that the farmer who takes a buggy ride on Sunday is engaged in a sport. The term "sport" involves the element of competition. The use of automobiles for pleasure driving, irrespective of all considerations of sport, has become an established practice. Besides this, there is also the wide field of application of the automobile in commercial work.

There is no reason why the use of the automobile for legitimate pleasure driving should ever diminish. The number of people who can afford to keep a pleasure vehicle is constantly increasing, and the automobile is still being perfected and made constantly more superior to other pleasure conveyances. The field of commercial work is also constantly widening and will continue to do so.

The only branch of the automobile movement that is bound to be ephemeral is the sport. Sporting events are the means of creating a false interest in automobiles and of inducing numbers of people who cannot afford them to buy them. The multiplication of sporting events, no doubt, has the effect of temporarily stimulating the demand for automobiles, but who is to be benefited thereby? Certainly not the conservative manufacturer who constitutes the backbone of the industry, nor the capitalist who has money invested in it. There are only two classes of individuals who will be benefited by "keeping up the sporting end," viz., the sport promoter and the company promoter. The latter takes advantage of the artificially created, mushroom-like market to unload watered stock on the public, and the sport promoter, therefore, plays directly into his hands.

If we wish to maintain the industry, give it stability and permanence, and make it a promising field for investment by conservative capitalists, instead of keeping up the sporting end we must drop it altogether as we proceed.

#### Air Jacketing of Motors.

Several years ago a considerable number of engineers took up a form of cylinder cooling by forcing an air blast from a ventilator through a jacket covering the cylinders. The method was exemplified in a car which then occupied a somewhat more prominent position in the market than now, and its characteristics seemed to appeal strongly to the engineering world. Owing, however, to the disfavor with which the general public began to look upon the air cooled motor about that time, those who intended to bring out motors with air jacketed cylinders were unable to secure the necessary financial backing, and this cooling system has continued to be a feature of a solitary make of car in this country. That it possesses real merit may be inferred from the fact that it has just been adopted by the manufacturer having the most extensive experience with air cooled motors. A deviation from the previous system consists in the use of a flywheel fan in place of a blower.

It is not difficult to recognize a number of distinct advantages in the air jacketing system over the conventional method of cooling by means of exposed circumferential flanges, either with or without a fan. Where a fan is used, as is absolutely necessary with air cooled vehicle motors, a considerable proportion of the air moved by it goes astray and never strikes the cylinders. In this connection it is apropos to mention that there are some buggy motor designs of the double opposed air cooled type with flywheel fan in which the cooling effect must be almost entirely confined to the crank chamber. The jacketing of cylinders and the circulation of air through the jacket undoubtedly admit of, a higher degree of efficiency of the air circulation. That is, more heat units should be abstracted from the cylinders per unit of power consumed in driving the fan or ventilator. It should also be possible to better distribute the cooling effect. Where a blast of air is directed from one end against a four or six cylinder motor, it is obvious that the cooling effects on the different

cylinders cannot well be uniform, even though the radiating flanges may be differently spaced on the different cylinders to secure this object. With an air jacket the application of the cooling blast to the hot surfaces is accomplished in a much more rational manner. The cold air first strikes the head of the cylinder, which absorbs the greatest amount of heat from the burning gases. As the air becomes heated, and therefore a less effective cooling agent, it passes over the inner end of the cylinder wall, which requires less cooling. As to distributing the cooling effect between the different cylinders, this should be a matter of no difficulty.

Perhaps not the least advantage of the air jacketed cylinder over the exposed flange type resides in its smooth and relatively cool outside surface. The flanges of the conventional air cooled cylinder cannot well be finished, as no form of paint or enamel would long withstand the temperature to which these flanges attain. On this account, and also because the flanged surface is hard to clean, air cooled motors generally present a dirty, neglected aspect. The fact that on account of the high temperature it is impossible to wipe or otherwise clean a flanged cylinder while the engine is running, and for some time after, has also something to do with this neglected appearance.

The air jacket system should therefore make it possible to cool a motor more uniformly and with less expenditure of power than the conventional system, and should make a neater looking engine, easier to keep bright and clean.

# Taxing Fuel for Use in Pleasure Vehicles.

A tax upon gasoline used for motor vehicle fuel is being advocated in England and in certain Continental countries as being the probable source of considerable revenue, and as constituting a tax the incidence of which would fall mainly upon well to do persons. These proposals usually contain a provision by which gasoline used in the propulsion of commercial vehicles shall pay a less rate than that used in pleasure vehicles, or shall be entirely exempt, so that the burden shall not be seriously felt by business interests.

So far as the incidence of the tax is concerned there should perhaps be no serious objection from the standpoint of the political economist, but it would seem that there might be serious difficulties in pre-

ng evasions, as the enforcement of a

tax upon a commodity when used for a specific purpose only is ordinarily a difficult matter.

So long as the tax imposed represents only a reasonable percentage of the value of the gasoline, it would probably have but a slight effect upon the automobile industry, for the cost of fuel is not yet by any means the major item in the cost of operating a pleasure car.

Raising the cost of gasoline by imposing a tax might, however, tend to drive motorists to the use of untaxed fuels, if their application presented any economic advantages as compared with taxed gasoline. Increased cost of fuel arising from any cause tends toward the development of economical methods of using it, and a gasoline tax might thus be expected to stimulate research and invention in the direction of fuel economy.

The motor car is still regarded by the masses as the vehicle of the rich, and as long as this view prevails taxes of various kinds which bear upon it will continue to be proposed by legislators who are seeking popular approbation.

# The Increasing Satisfaction Given by Pneumatic Tires.

The recent rather general reduction in the weight and power of new models has done more to reduce the cost of operation than is generally appreciated, for in addition to the saving in mechanical items there has been a great saving in tire maintenance. Indeed, on some of the recent small cars the tire expense seems to be merely nominal compared with the figures for the larger machines.

The manufacture of tires for large, heavy machines made necessary a careful study of tire structure, for the best combination of rubber and fabric which can be produced is taxed nearly to the limit of its strength in supporting the weight of a heavy, rapidly moving vehicle against road shocks, and at the same time transmitting the torque of a powerful motor. The experience gained in the manufacture of large tires has naturally been incorporated in the smaller sizes, and has resulted in the longer life and greater freedom from trouble just mentioned.

It is comparatively easy to get tires for the smaller machines which are somewhat stronger than they need be to give satisfactory service, and when these extra large tires are placed under a car they are often remarkably long lived. The use of larger tires has wisely been encouraged by the tire manufacturers, who have brought out intermediate sizes which fit the next smaller size of rim. Thus a 30x3 inch tire may be replaced by a 31x3½ inch, or a 32x3½ inch by a 33x4 inch.

The standard tire equipment of low priced cars is almost invariably the standard size which the tire manufacturer recommends, but provisions are made in the clearance of mudguards, brake connections, etc., and in the clearance for swinging the front wheels for the special size of tires. These larger tires are furnished at an extra price, and the car agent is always ready to recommend their adoption.

That the public is educated to the wisdom of paying a little more for tires at the start to secure longer life and greater freedom from trouble is evident, for we notice that a goodly portion of the moderate priced machines are fitted with the special sizes.

Judging from what users of recent light cars have to say about the infrequency of punctures and the generally satisfactory service given by the later tires, there is less excuse at the present time for adopting solid tires on pleasure cars for use over ordinary roads and streets. Under such conditions the solid tire is probably not much cheaper to run than the pneumatic, which latter gives considerably greater satisfaction, since it makes it much easier to keep the car from rattling.

There are, of course, certain classes of service and certain kinds of roads where the solid tire presents many advantages; but for the conditions we have mentioned we think that it is not too much to say that the pleasure vehicle tire problem is quite satisfactorily solved by the present day pneumatic.

#### Coming Events.

July 31—Kansas City (Mo.) Race to Elm Ridge Park, Kansas City A. C. July 31—Richfield Springs Hill Climb.

August 5—Algonquin (Ill.) Fourth Annual Hill Climb on Algonquin and Perry Hills, Chicago

August 17—Cheyenne, Wyo., Track Meet, A. C. of Cheyenne.

August 31 or September 30—Milwaukee (Wis.) Annual Orphans' Outing, Milwaukee A. C. September 6-11—Lowell (Mass.) Annual Motor Carnival. Lowell A. C.

September 15—Denver (Col.) Start of Flag-to-Flag Race to Mexico City, Denver M. C.

October 7—Philadelphia (Pa.) Second Annual 200 Mile Stock Chassis Race in Fairmount Park, Ouaker City M. C.

November 6 to 13—National Automobile Show under the auspices of the N. A. A. M. at Atlanta, Ga.

December 29·30—Philadelphia (Pa.) Annual Midwinter Endurance Contest, Quaker City M. C. December 31 to January 7—New York City Annual Show, Grand Central Palace, American Motor Car Manufacturers' Association.

#### The Taxicab Business in New York City.

BY JOSEPH A. ANGLADA.

Within the past year the number of taxicabs operating in New York city has increased from a bare 100 to over 1,800 cabs. About 50 per cent. of the cabs now operating are the products of French factories, while the balance, with the exception of about eighty British cabs and twenty from German factories, were built in this country. About 90 per cent. of the taxicab business is in the hands of companies operating from six to 600 cabs.

Taxicabs plying in New York city must be licensed by the municipal authorities. An annual fee of \$10 is charged for each private or public vehicle, a private vehicle being licensed to operate from certain cab stands, and a public vehicle to solicit patronage at any point, except private stands. The public vehicles are designated by the municipal license number displayed on the front of the oil lamps carried. Taxicab drivers are also licensed annually upon the payment of a fee of \$2. The maximum legal rates are fixed by a city ordinance which makes a distinction between two and four passenger vehicles. Most companies, however, charge the same for one or four passengers, and the ordinance states that "all rates of fare shall depend upon the number of persons which each vehicle is intended to seat inside, and not on the number of passengers actually carried."

The standard rates fixed by the law, which goes into effect in October, are 30 cents for the first half mile or part thereof for two passenger cabs, and 40 cents for four passenger cabs; for each additional quarter mile or part thereof, 10 cents for both two and four passenger cabs. The charge for waiting is \$1 per hour for two passenger cabs and \$1.50 for four passenger cabs. There is no charge for hand bags, dress suit cases or children under five years of age; but for each large piece of baggage a charge of 20 cents is made. One of the large companies has, however, just announced a new schedule of 30 cents for the first half mile and 10 cents for each additional quarter mile for four passenger cabs. The former rates of this company were 50 cents for the first half mile and to cents for each additional quarter mile. It will, therefore, be interesting to learn whether this company will be followed by others in the reduction of rates below those fixed by law.

The majority of the taxicabs in use have inside accommodations for four passengers. Two are carried on the rear seat and two on folding seats attached to the doors or to the back of the driver's seat. Many of the cabs which have been placed in service within the past three months have but one front seat, used by the driver, the adjacent space being used for carrying trunks, and in some cases a folding seat is provided for a fifth passenger, but it is seldom used. In addition to the following operating com-

panies there are close to 200 taxicabs operated individually by their owners, who in many instances were chauffeurs who realized the possibilities for profits in the operation of taxicabs, and, therefore, secured a small car, generally second hand, and had it fitted with a suitable body and taximeter. In addition to these owners there are others who have fitted taximeters to their regular hacking cars, besides small companies operating from two to four cabs and from whom the writer was unable to obtain reliable data relative to their operation.

# THE CARNEGIE HILL LIVERY AND MOTOR COMPANY,

with offices and garage at 109 East Eightysecond street, operates ten Thomas cabs, and in the fall will increase the number to twenty. The cabs are operated from four stands, located at the stable, 2 West Ninetieth street, 4 East Sixtieth street, and 15 East Thirtieth street, respectively. Pneumatic tires are used and spare wheels are carried as reserve. Rates are standard, and in addition to the regular stand business some of the cabs are operated on monthly contracts with individuals. The taximeters are driven from the front wheels, and most of the repairs to the cars are made in the company's shop. A maintenance contract for one year is in force with the manufacturers of the cabs. The company also has a maintenance contract with the tire manufacturers. The average distance traveled daily by each cab is 60 miles. Operators are paid a regular salary, and gasoline and oil are furnished free by the company. The company states that in winter the busiest hours are just before the opening and after the closing of the theatres, while in summer the afternoon is the busiest time of the day.

## THE KAYTON TAXICAB AND GARAGE COMPANY.

with offices and garage at 182 East Seventythird street, operates twenty-six Atlas cabs, and states that this number will be increased to sixty-six on or about the first of October. The cabs are used in hacking and stand business, with stands at the Hotel Webster, Burns' Restaurant, Sixth avenue and Forty-fourth street, and the Hotel Bristol. Pneumatic tires fitted to quick detachable rims are used as standard equipment, and while at present the company does not specialize in conducting private services, cabs may be obtained for lengthy trips. The taximeters are driven from the front wheels and all repairs to the cars are made in their own shop. There is no maintenance contract between the manufacturers of the cars and the company, but a maintenance contract on a mileage basis is in force with the tire manufacturers. Fortyfive miles is the daily average of each cab, and the operators are paid a regular salary. Gasoline and oil are furnished free. In win-

ter the busiest part of the day is between 6 and 10 p. m., and in summer from 4 to 10 p. m.

THE MASON & SEAMAN TRANSPORTATION COMPANY.

with offices and garage at 200 West Seventy-seventh street, at present operates 197 cabs, 150 Delahaye, 40 Pilain and 7 Locomobiles, which number will be added to as the growth of the business warrants. These cabs are not used in a regular hacking service, but in a private livery service, and are operated from the following stands: 173 West Eighty-ninth street, 218 West Fiftieth street, Seventy-eighth street and Park avenue, Seventy-seventh street and Amsterdam avenue and the Park Avenue Garage, between Sixty-third and Sixtyfourth streets on Fourth avenue. Standard clincher pneumatic tires are used, and the taximeters are driven from the front wheels. All repairs are made in the company's shop, and while there is no maintenance contract with the makers of the cabs the tires are guaranteed for 5,000 miles. The drivers are paid a regular salary, in addition to a commission, and are furnished with gasoline and oil free of charge. This company caters especially to private trade, and to charge accounts. Excepting special events, the busiest hours are from 9 a. m. to 1 p. m.; 2 p. m. to 6 p. m. and from 7 to 12 p. m.

THE MOULTON STABLE COMPANY.

with offices and garage at 828-830 Seventh avenue, operates fifteen Thomas and ten Delahaye cabs at present, but will add to this number in the fall, the number being determined by the increase of business. A regular hacking business is conducted from the Hotel St. Regis, Hotel Gotham, University Club, New York Athletic Club and the Criterion Club. Cabs are fitted with pneumatic tires and spare wheels. While no special services to pleasure resorts are conducted, an extensive business is done in this line. All repairs are made in the company's shop and a maintenance contract for one year is in force with the Thomas Company. The tires are not maintained under contract by the tire manufacturers. The operators of the cabs are paid a regular salary of \$2.50 per day, and gasoline is furnished them free of charge. The busiest hours of the day at all seasons are from 5 to 12 p. m.

THE NEW AMSTERDAM MOTOR COMPANY, with offices and garage at 152 West Fifty-sixth street, operates eighteen Crawford taxicabs and twelve Crawford touring cars. A regular hacking business is being conducted, the company having no fixed stands. The cars are fitted with pneumatic tires and quick detachable rims. The standard rates are charged for both the cabs and touring cars, the latter being usually engaged for extended trips to pleasure resorts and country places. The taximeters are driven from the front wheels. All repairs are made in the company's shop. A

maintenance contract is in force with the manufacturers of the tires, but not with the manufacturers of the cars. The daily average distance covered by each machine is 35 miles. The operators are paid a percentage of the earnings of the car. Gasoline and oil are furnished free. In the winter the busiest hours are between 6 and 8 p. m., and in summer the business is practically the same at all hours of the day.

THE NEW YORK TRANSPORTATION COMPANY. with offices and garage at Eighth avenue. Forty-ninth and Fiftieth streets, at present operates 493 cabs, comprising 400 Columbia electrics, 53 Delahaye cabs and 20 cabs of miscellaneous makes. At present there are 250 De Dion-Bouton 14 horse power, four cylinder cabs on order, the first shipment of which will be received by September 1. The business is conducted from stands located at Sherry's and Delmonico's restaurants, Fifth avenue and Forty-fourth street; Café Martin, Fifth avenue and Twentysixth street; Hotel Belmont. Park avenue and Forty-second street; Hotel Astor, Broadway and Forty-fifth street; L. I. R. R. depot, foot of East Thirty-fourth street; Central R. R. of N. J. depot, foot of West Twenty-third street, and several hotels and clubs. Solid tires are used on the electric cabs and pneumatic tires fitted to quick detachable rims on the gasoline cabs. Standard rates are charged, and in addition to the regular business conducted from the private stands special services on a monthly payment basis and a regular flat rate service to and from Coney Island are conducted. The taximeters on the cabs of this company have always been driven from the front wheels. All repairs, including repairs to the taximeters, are made in the company's shops. A maintenance contract is in force with the tire manufacturers, but not with the car manufacturers. The average daily mileage of each cab is 25 miles. Drivers are paid regular wages on an hourly basis, with a higher rate for overtime. Gasoline and oil are furnished free. The amount of business varies greatly with the weather and other conditions, but usually the busiest hours are from 8 to 9 p. m. on week days and 2 to 4 p m. on Sundays.

THE NEW YORK TAXICAB COMPANY, with offices and garage at 622 West Fiftyseventh street, operates about 600 Darracq cabs, and states that this number is added to weekly. The weekly additions and the final number of cabs which it is intended to operate are, however, not given. The company also states that the cabs are operated from sixty stands, some of which are located as follows: Pennsylvania R. R. depot, foot of West Twenty-third street; Hotel Breslin, Imperial Hotel, Park Avenue Hotel, Marlboro Hotel, Victoria Hotel, Hotel Albany, Metropole Hotel, Manhattan Hotel, Rector's Restaurant, Churchill's Restaurant, Reisenweber's Hotel, Woodward Hotel, Wyoming Apartment House, Plaza Hotel, Netherland Hotel, Savoy Hotel, Marie Antoinette Hotel, St. Andrew's Ho-

tel. Majestic Hotel, Freundschaft Society. Central Park Casino, Bretton Hall, Harlem Casino, Colonial Hotel, St. Regis Hotel, Consolidated Stock Exchange Building, 26 Broadway, Madison Avenue Hotel, Flatiron Building, Strand Hotel, St. Denis Hotel, Lüchow's Restaurant, Hotel Chelsea, Mt. Sinai Hospital, Hotel Aberdeen, Martha Washington Hotel, 413 Broome street, northeast corner Broadway and Eightyeighth street, northwest corner Broadway and 100th street, northeast corner Broadway and 126th street, southeast corner Broadway and 145th street, and the Lafayette Baths. This concern has no maintenance contract with the manufacturers of cars and tires. Repairs are made in the company's shop. Drivers are paid a percentage of the earnings of their cabs. A regular flat rate service is conducted to Coney Island, the charge being \$5 for a cab for four persons from any point below Fifty-ninth street to Coney Island or re-

#### THE RENAULT TAXI SERVICE COMPANY.

with offices at 214 West Sixty-fifth street, operate fifty Renault cabs, and state that in the fall fifty additional cabs will be added to the service. A hacking business is conducted from six stands, the locations of which were not furnished by the management. Cabs are fitted with pneumatic tires and spare wheels, and the rates are as specified by the municipal ordinance. Taximeters are driven from the rear wheels, and all repairs are made in the company's shop. At present there is no maintenance contract in force with the manufacturers of the cars, but there is a contract with the tire manufacturers, the nature of which could not be ascertained. Fifty miles is stated to be the average daily mileage of each cab. Drivers are paid a regular salary, and gasoline and oil are furnished them free of charge. The company operate a few cabs on a regular monthly payment basis, and state that their cabs are busy about twelve hours each day.

THE UNION TAXICAB AUTO SERVICE COMPANY, with offices and garage at 230 West Fiftyeighth street, operate 17 Thomas, 4 Locomobile, 4 Stevens-Duryea and 11 Ewing cabs, and at an early date additional cabs will be added to the service. The business is conducted from six stands. The cabs are equipped with pneumatic tires, some of which are fitted to detachable rims, while the remainder have spare wheels. Taximeters are driven from the front or rear wheels. All repairs can be made in the company's shop. There is no maintenance contract in force with either the cab or tire manufacturers. The drivers are paid a regular salary, and are furnished with gasoline and oil free of charge.

THE UNIVERSAL TAXIMETER CAB COMPANY, with offices and garage at 153 East Fifty-third street, operate fifty Argyll cabs from stands at the Hotel Knickerbocker, the Astor House and Hotel Buckingham. This

number will be increased to 100 within a short time. The taximeters are driven from the front wheels. All repairs are made in the company's shop. Maintenance contracts are in force with the manufacturers of both the cabs and the tires. Fifty miles is given as the average daily distance of each cab. The operators are paid a regular salary and are furnished with gasoline and oil free of charge. The cabs are in greatest demand Saturday night from 8 p. m. until 2 a. m.

#### THE TAX-A-AUTOCAB COMPANY,

with offices and garage at 103 West 108th street, and formerly of 110th street and Eighth avenue, operate ten Thomas cabs, and in the fall will add as many cabs as the increase of the business demands. The company has a stand at Pahst's, 125th street. and a summer service is conducted from the new Monmouth Hotel, Spring Lake, N. J. Some of the cabs are fitted with solid tires, and the cabs having pneumatic tires are equipped with quick detachable rims or spare wheels. Heretofore the taximeters have been driven from either the front or rear wheels, but as early as possible the drive will be changed to the front wheels on all cabs. A maintenance contract is in force with the manufacturers of the cars, who will replace all parts proving defective in service, and a contract with the tire manufacturers is also in force. This company state that about 90 per cent. of the mechanical troubles with the cabs are traceable directly to the drivers. Seventy-five miles is given as the average daily distance traveled by each cab. The drivers are paid a salary and commission, oil and gasoline being furnished free of charge. On week days the busiest hours are in the early morning and in the early evening in summer, and in the evening in the winter. The amount of business done on Sunday depends to a great extent upon the weather. If the weather is pleasant many people take long trips, while if it is unpleasant short trips are made.

#### THE TAXI-SERVICE COMPANY,

with offices at 334 Fifth avenue and a garage at 142 East Thirty-first street, have fifty Berliet and fifty Sultan cabs in operation. This number is added to weekly. The business of the company is conducted entirely from stands, some of which are located as follows: Waldorf-Astoria, Holland House, Hotel Seville, Healy's Restaurant, Walcott Hotel, Park Avenue Hotel, Stratford Hotel, Colony Club, Belleclaire Hotel, Marseille Hotel, Leonora Hotel, Hermitage Hotel and the New Grand Hotel. All of the cabs are fitted with pneumatic tires, and at present the spare wheels in use are being superseded by quick detachable rims. Some of the cabs of this company are used as private vehicles on a monthly charge basis. The taximeters are driven from the front wheels of all cabs. All repairs are made in the company's shop. A maintenance contract on a mileage basis is in force with the tire manufacturers, but there is no such contract with the car manufacturers. The daily mileage of each cab is 50. The drivers are paid a regular salary and are furnished with gasoline and oil free of charge. The company, however, keeps a close record of the amount of each furnished to the individual cars, so that a monthly or weekly comparison can be made between the distance traveled by the cab and the amount of fuel and lubricant used. From 12:30 to 2 p. m. and from 7:30 to 8:30 p. m. are the busiest hours on week days, and from 12 to 6 p. m. on Sundays in summer.

#### THE TAX-A-CAB TRANSIT COMPANY.

with offices and garage at 55 West Ninetythird street, employ thirty-five cabs, some of which are electric vehicles fitted with solid tires. The gasoline cabs are of Atlas and Buick make. In the fall ten additional gasoline cabs will be put in service. The pneumatic tires in use on the gasoline cabs are fited with quick detachable rims. Special monthly or yearly private contract services are conducted, in addition to a regular hacking business. The taximeters are driven from the front wheels, and all repairs are made in the company's shop. The average daily distance traveled by each cab is given as 50 miles. The operators are paid a salary and commission, and are furnished with gasoline and oil free of charge.

#### THE WEST END MOTOR CAB COMPANY,

with offices at 1497 Broadway and garage at 246 West Fifty-sixth street, operate twenty-one Thomas cabs, and in the fall will increase this number to fifty. In addition to a regular hacking business the cabs are operated from stands at the Lotus Club and Engineers' Club. The cabs are fitted with pneumatic tires on quick detachable rims, and the taximeters are driven from the rear wheels.

All repairs are made in the company's shop, and 50 miles is given as the average daily distance traveled by each cab. The operators are paid a percentage of the earnings of their cab, and gasoline and oil are furnished to them free of chrge. The busiest hours on week days are from 7 to 9 p. m., and on Sundays from 2 to 5 p. m.

# THE WYCKOFF-CHURCH & PARTRIDGE TAXICAB COMPANY.

with offices and garage at 232 West Fiftysixth street, at present operate thirty-five Bristol cabs. This number is being added to at the rate of about five per week. The business will be conducted from stands located in various parts of the city. The cabs are fitted with pneumatic tires on quick detachable rims, and the taximeters are driven from the front wheels. Special services at monthly rates, as well as regular flat rate services to pleasure resorts, are conducted. All repairs are made in the company's shop, and there is a maintenance contract with the manufacturers of the cabs and of the tires. Forty-five miles is given as the average daily distance covered by each cab. The drivers are paid a regular salary. This service has been in operation only about three weeks.

#### THE WESTCOTT EXPRESS COMPANY

are operating a number of Berliet cabs from the Grand Central Station. These cabs are not fitted with taximeters, the rates being the same as for the horse drawn xehicles, in conjunction with which they are operated. These cabs are fitted with solid rubber tires, but the management having refused information relative to the operation of the service we are unable to state with what success. In Brooklyn regular taxicab services are conducted by two operating companies, in addition to about twenty-five privately owned vehicles fitted with taximeters.

#### THE GREEN TAXICAB COMPANY,

with offices and garage at 159 and 161 Clymer street, operate ten Autocar cabs from stands at the garage, and in summer from Steubenbord's Hotel, Coney Island, and regularly from Edgett's Café, the Borough Hall and the Hofbrau House. The cabs are fitted with pneumatic tires on quick detachable rims, and the taximeters are driven from the front wheels. A maintenance contract on a mileage basis is in force with the tire manufacturers. Fifty miles is given as the daily average distance traveled by each cab. The driver is paid a salary and commission, oil and gasoline being furnished free of charge. In summer the cabs are kept busy from 11 a. m. to 4 a. m. The service having been inaugurated only this season, the extent of the winter traffic is unknown.

# THE BROOKLYN TAXICAB COMPANY,

with offices at 100 Putnam avenue, operate twenty Thomas cabs, and in September will add twenty-five more. The cabs operate from stands located at 100 Putnam avenue. 8 Nevins street, the Clarendon Hotel and Silsbe's Restaurant. Pneumatic tires on quick detachable rims are fitted to all of the cabs. The taximeters are driven from the front wheels; all repairs are made in the company's shop. Fifty miles is given as the average daily distance traveled by each cab. the operators are paid a straight salary and are furnished with gasoline and oil free of charge. A special service at the following flat rates is conducted between Coney Island, Brooklyn and New York, the rates being the same for one to four persons: Conev Island to any Brooklyn subway station, or vice versa, \$3.50; to any point in Manhattan south of Fifty-ninth street, \$5; to any point in Manhattan north of Fiftyninth street and south of 100th street, \$5.50; to any point in Manhattan north of 100th street and south of 156th street, \$6.

Most of the above companies have their cabs painted in distinctive combinations of colors, and their operators are generally clad in uniforms of dark cloth with caps to match, and in some cases they wear leather leggings.

# International Standard Screw Threads.

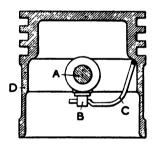
The following table of international standard screw threads may be of interest to those who have repair work to do on imported cars:

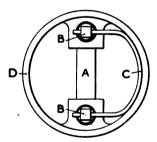
Angle of thread,	60 degree	es. Flat, 1/8	of P.
Diam-		Tap T	ap Drill,
eter.	Pitch.	Drill, Flat.	Sharp.
(Mm.)	(Mm.)	(Mm.)	(Mm.)
6	1.00	5.2	5.
7	1.00	6.2	6.
8	1.25	6.8	6.5
9	1.25	7.8	7.6
10	1.5	8.5	8.3
11	1.5	9 · 5	9.3
12	1.75	10.2	10.
14	2.00	11.8	11.5
16	2.00	14.	13.8
18	2.5	15.2	15.
20	2.5	17.2	17.
22	2.5	19.2	19.
24	3.00	20.6	20.5
27	3.00	24.	23.8
30	3 · 5	26.	25.8
33	3 · 5	29.	28. <b>8</b>
36	4.00	31.5	31.3
39	4.00	34.5	34.3
42	4.5	37 •	36.8

Pitches of sizes between standard diameter are the same as for the next smaller standard diameter.

# Novel Method of Securing Wrist Pin Set Screw.

The sketch herewith, taken from our French contemporary Omnia, shows an unusually secure method of holding the pis-





METHOD OF SECURING PISTON PIN.

ton pin in place in a vehicle motor. The pin itself is held by two square headed set screws. The heads of the set screws are drilled through. A length of steel spring wire is bent to such shape that its central portion will rest against the shoulder in the wall of the piston when the two ends are slipped through the holes in the screw heads. The ends of the spring are offset so as to limit the distance the ends pass through the heads of the set screws.

# Running Schedule and Diagram Chart Showing Details Pertaining to the Operation of a Taxicab Service.

BY EDWARD WELLS.

The accompanying chart and diagram have been designed to fulfill the following purposes: To supply the directors and management with a comprehensive sheet covering the actual car operations of the entire equipment for stated periods, which will include all important figures and data relating directly thereto, compiled in a simple and discernible manner; a sheet which will enable the management to determine upon the various "shifts" for all cars for a given period in advance, and which will also enable them to follow the various movements of these cars daily and without the necessity of going through detailed reports in order to obtain the information they may seek. One of the principal purposes is to enable them to follow the movements of any car, to compare its earnings and expense of operation with those of any other car or cars, so that if at any time certain cars fail to show the average earnings, this fact may be readily discovered and the cause ascertained and remedied, without the liability of such facts continuing long unnoticed, as would be the case where individual reports only are made, rendering it necessary to go through each one in turn. It is also easy to observe the fact of any car or cars being laid up for repairs, as these are shown by red dashes on the diagram covering the period during which the cars are out of service because of this necessity. In the event of more details concerning any individual case of repairs being required, the repair department ticket for the car in question may be obtained from the superintendent.

Care has been taken to show upon this diagram only figures relating to the actual operation of cars, and it has not been considered necessary to include the apportionment of various overhead and indirect charges, which will, however, be done upon the regular monthly statistical reports of the company. Therefore, under the heading "Operative Expense of Each Car" have been included the following items only: Chauffeurs' wages, proportionate wages of starters, wages of cleaners, actual cost of repairs (including cost of labor, but not supervision), cost of gasoline, oil and waste used, and mileage cost of tires. In order to determine the net profit, it will be necessary to add to the foregoing a proportionate amount on the following indirect expense and charges: Garage rent, salaries of superintendent and minor garage officials, salaries of officers and office employees, office rental, advertising, insurance, incidentals and depreciation of rolling stock.

As previously stated, all of the foregoing will be taken into account upon the regular monthly or periodical reports, as will also more detailed information concerning the

actual number of passengers carried and recapitulation of various other items.

AN EXAMPLE

To enable one to more readily understand the accompanying sheet and its actual use, a few examples will be given herein.

First, we find that the running schedule for all cars is laid out in advance by a system of dashes, which indicate the hour upon which each car is dispatched upon its run daily, as well as the hour of its return to the garage. In the event of the car coming in disabled before completing its regular run, a red dash is made (this is figured to the nearest quarter day), and this dash is continued along the other line while the car is laid up. Thus upon reference we find that car No. 3 with regular driver No. 103 in the first division, under Foreman John Smith, was dispatched upon its regular shift on Tuesday, October 13, at 7 a. m., but returned disabled at 7 p. m., six hours before the close of the allotted day's run for this car, and that it remained in the repair shop for 18 hours (running time) or 36 hours (actual time) going on again Thursday, the 15th, at 7 a. m., remaining upon its regular schedule up to Tuesday, the 20th, when it again reported in for repairs at 7 p. m., which repairs were made in time to enable the driver to take it out as usual the following day. We find, therefore, in the case of the foregoing, that out of the scheduled 210 running hours for the period of 14 days, this car was in actual service 186 hours, having been in the repair shop during 24 of its scheduled running hours.

The movements of every car in the service may be similarly determined by glancing at this diagram. For instance, we find that car No. 9 under regular driver No. 109 remained in service during the entire period shown, without reporting in for repairs at any time. The comparative gross receipts and net earnings of each car are readily ascertained by glancing at the columns under these respective headings. For instance, we find that the gross receipts of car No. 6 for the 14 days were \$371.10, and that the operative expense for this car was \$121, indicating a net earning of \$149.90.

We also find that the total mileage run by the car just referred to was 960 during this period, of which 760 miles is designated as earning mileage, the remaining 200 miles being "deadhead mileage" (so called).

We are also able to determine just how many cars are in service during each shift every day. For instance, we find that upon Friday, the 16th, from 7 p. m. to 1 a. m., there were 14 cars in service. There should be 15 upon this shift regularly, but in this instance car No. 8 was in the repair shop at the time stated.

Substitute drivers are shown by a blue

X and are designated individually by letters, A, B, C, etc. Upon this diagram arrangements are made in advance to allow each regular driver to be off duty one day out of seven, at which time a substitute will take his car. In the event of regular drivers being off duty unexpectedly, a substitute will, of course, take their place, and this will also be shown upon the diagram by a blue X. As an example of following the movements of the substitute drivers, we find that driver B takes car No. 3 on Monday, the 12th, at 1 p. m.; that on Tuesday, the 13th, he takes car No. 5 at 1 p. m., etc.

The various figures shown upon this diagram are entered from day to day or at stated periods from the daily or periodical reports, which will be furnished by the operative department.

All figures and statistics will be so counterchecked and proven as to render it impossible for any employee to furnish fictitious reports without detection.

In addition to giving information concerning each car for a stated period, this diagram also gives certain detailed information concerning all cars daily. For instance, under date of Saturday, the 17th, we find that there were in the repair shop cars the time for repairing of which aggregates twenty-four hours, whereas under date of Tuesday, the 13th, the aggregate hours for repairing amount to but six.

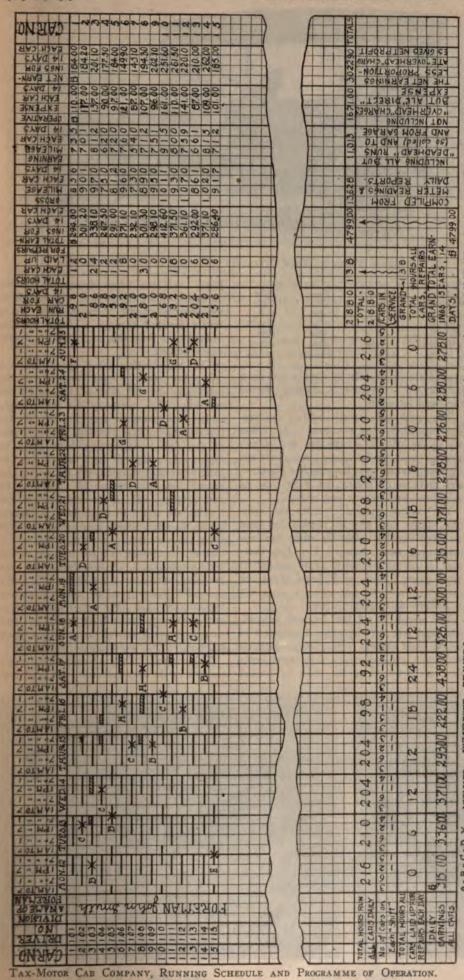
It may prove very expedient to have this to refer to in the case of there being claims of congestion in the repair department from time to time, it being easy to make comparisons of the figures given in this manner. We also have the gross receipts compiled daily, as well as the gross mileage run by all cars, and the total hours in service daily for all cars.

It will be seen that provision has been made to have all cars in service during the busiest hours of the day, i. e., from 7 p. m. until I a. m., and that certain cars remain in service during the entire night; also that there are more cars in service during the afternoon hours than during the forenoon. The number of cars on each "shift" may be varied to suit the actual demands upon the service.

In the accompanying chart and diagram various figures and dates are used for example only, and have no bearing upon the actual prospects of operation of the company.

While the movements of only 15 cars are shown, the same system can easily be used for any number up to 150, without confusion. In case more cars than these are in service, it will be advisable to utilize more than one sheet at a time.

[As the diagram originally furnished by the author is in colors, it is not possible to exactly reproduce it in the paper, but a word of explanation will make clear the differences between the original and the reproduction. The cross sectioned rectangular spaces in the diagram, which indicate periods of time the cars are in the repair shop, are red pencil lines in



the original diagram. The marks Ax, Bx, etc., which indicate that the car was being driven by a substitute driver, are in blue pencil in the original diagram. The horizontal line showing the "Total Hours All Cars Laid Up for Repairs Each Day," and the vertical column, headed "Total Hours Each Car Laid Up for Repairs," are in red ink. The horizontal line showing "Daily Earnings All Cars," and the vertical column showing "Total Earnings for Fourteen Days Each Car," are in yellow ink. The two columns headed, respectively, "Operative Expense Each Car Fourteen Days," and "Net Earnings Each Car for Fourteen Days," are also in yellow ink .- ED.]

# Conditions Tending to Quiet Running of Motors.

The Association of Licensed Automobile Manufacturers is sending out a circular in which the conditions tending to quiet running of gasoline motors are discussed. Some of the principal causes of timing gear noises are inaccurate machine work in the crank case, leading to too wide variations in the distance between gear centres; unsuitable crank shaft and cam shaft bearings, causing jumping of the shafts when the motor is running; inaccurately spaced and poorly designed gears, causing warping after the strain of cutting the teeth is removed. The utmost care must be taken in fitting up cam gears.

The chief cause of the noisy operation of timing gears is the intermittent load due to the lifting action of the cams, causing intermittent pressure on the teeth, and even reverse pressure, producing slapping of the gear teeth due to backlash. In order to reduce this cause of noise to a minimum the weight of the valve mechanism should be made as small as possible, the valve springs made as light as possible, relatively non-resonant material should be used; the cam should be shaped to give a gradual action to the valve plungers, and the gears should be made with a proper pitch and effectively lubricated.

The noises from pistons, connecting rods and crank shafts have been practically eliminated by accurate machine work, level bearing surfaces and proper Inbrication methods. Pistons and connecting rods must be made as light as possible, and all in the same engine of equal weight. The crank shaft must not be made too light, and undue sideplay of the connecting rods must be avoided. The main cause of valve noise is the slapping of the valve on its seat. The valve's descent should be gradually arrested just before it strikes its seat by a very gradual taper of the cam incline. The valve springs should be of sufficient strength to keep the roller in contact with the cam. One experimenter claims that if the cams are properly designed the seating of the valves cannot be heard outside the motor, with the manifolds, carburetor and muffler connected.

# NEW VEHICLES



## Peerless 1910 Models.

The Peerless line for 1910 will consist of three distinct chassis models, viz., a four cylinder 20 horse power, a four cylinder 30 horse power, and a six cylinder 50 horse power. The latter two will be made in different lengths of frame, for roadster and touring bodies respectively, so in one respect five different models will be turned out. A wide variety of body types is offered the purchaser. The following table gives the main dimensions of the five models.

The 30 horse power and 50 horse power



PERLESS MODEL 27. FOUR CYLINDER, 30 HORSE POWER TOURING CAR.

Model.	Rated H. P.	Cylinder Dimensions.	Wheel Base.	Front Tires.	Rear Tires.
27 Roadster		476×51/2 476×51/2	11836	36x4	36x5
28	. 50	476×51/6	136	36x4	36x5
28 Roadster		476×536 4 ×436	13252	36x4 32x31/2	36x336

models are developments of last year's car, but the 20 horse power is a new design of the town car.

The new models present no radical changes in appearance. The radiator and bonnet are precisely the same, and the body is of the same dimensions. Between the front seat and dash the toepiece is carried up to the dash in a curved line instead of at an angle as heretofore, and the medallions which have heretofore been used in the moldings are now eliminated, the moldings being straight, which is desirable in order to get the best striping effect.

The construction of the motor is essentially similar to 1909 models. The oiler, however, is of new design, and all the pump mechanism is now placed in the oil reservoir, which is, as formerly, a part of the aluminum crank case. The oil level in crank case is regulated by standpipes as formerly, but the pet cocks attached thereto may be

opened simultaneously by simply turning a thumbscrew conveniently located behind the hand oil pump.

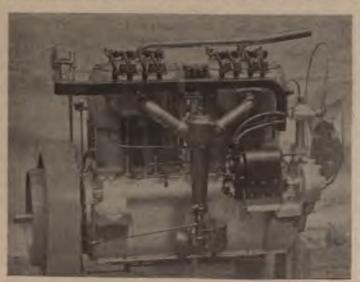
The spark and throttle control mechanisms are somewhat improved. All joints are of the ball and socket type and adjustable for wear, so that these connections are extremely sensitive to the operator's control, and there is no chance for such wear as will cause backlash or lost motion.

The cooling system includes the same type, shape and size of radiator as used in 1909, together with the same herring-bone gear water pump. The fan, however, is driven by spiral gears instead of bevel gears. Such small bevel gears are extremely hard to cut, and are more apt to become noisy through use.

The clutch is of the internal expanding band type, of the same dimensions as in the 1908 model. The pedals operating the clutch and brake are of different type; they are attached to the shaft by hinged joints and thus adapt themselves to the normal position of the foot, which adds to the security of the operator. The shafts thrust forward through a small opening instead of a long slot, as in 1909 and previous models.

The transmission (four speed selective type) has been brought forward on the sub-frame for the sake of convenient inspection. By removing the floor board under the operator's feet, the top of the transmission case is exposed. In the cover of the case is fastened a hand plate by means of a bayonet lock, which can be instantly removed to expose the gears and provide an easy means of supplying oil and grease. All of the mechanism for locking the gears in mesh is now housed inside the transmission case proper, so that there are no exposed working parts to exude oil, accumulate dirt and present an unsightly appearance. A new device has been provided which is claimed to effectually prevent leakage of oil or grease from the transmission case. The speed change lever and emergency brake lever have also been carried forward and set in a more vertical position, so they are more easily reached.

This change in the transmission is important in the respects mentioned, and also



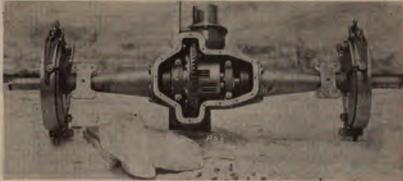
EXHAUST SIDE.



MODEL 27 MOTOR,

INLET SIDE





REAR AXLE AND CHANGE GEAR.

because of the decrease in the angularity of the propeller shaft; that is to say, the universal joint connections between the transmission and rear axle are more nearly in a straight line, and, therefore, loss of power and wear on these parts will be reduced.

In the propeller shaft the same kind of universal connections are provided for either end as in 1909 models, except that the housing is materially improved. There is a metal housing on each end of the universal joints, and between these housings there is provided a telescoping leather shield. These parts are very accessible,

Instead of the tubular type torque rod used in 1909 models, a pressed channel steel rod is now used, which is a little lighter and somewhat stronger, and, furthermore, in this type of construction there is no brazing, which it is always desirable to avoid where practicable.

As in the past, the front axle will be of I-beam construction, but will be of imported forgings.

The springs have been lengthened, the front 2 inches, and the rear 4 inches. They are imported from Lemoine, France, and are made from silico-manganese steel.

Each model of car will have two absolutely independent ignition systems.

A high tension magneto will be provided, and besides the same battery, spark coil and commutator system as used in 1909 will be carried. Two sets of plugs are used, and each connects separately with its own spark generating system, so that each may be used entirely independent of the other. The four speed selective type transmission is continued in practically the same form as in 1909. Platform spring suspension will be used in the 1910 models.

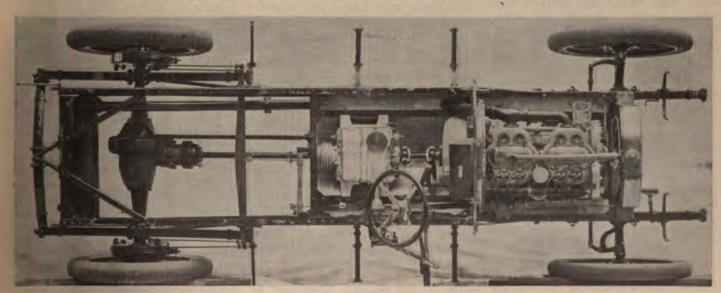
The new town car will be fitted with either landaulet or limousine bodies. Its design in general follows that of the larger cars, comprising such features as the four speed selective transmission, platform spring suspension, etc. But a departure has been made in placing the driver's seat at the left, with the gear shifting and emergency brake levers in the middle. It is claimed that this arrangement is very desirable for a car to be used chiefly in city traffic.

## The Multi Unit Motor.

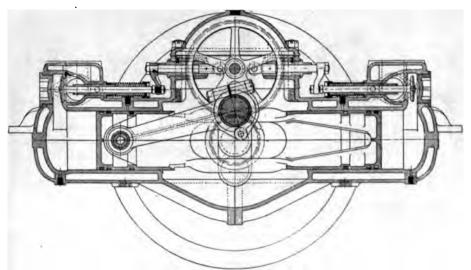
A novel type of four cylinder vehicle motor has been placed upon the market by the Multi Unit Gas Engine Company, of Chicago. The motor is of the four cycle, horizontal type. Among its chief features is the double headed piston construction, which is patented. Only two piston castings are required for the four cylinders, each of these double pistons acting on one connecting rod, whereby the throws of the crank shaft are reduced from four to two, and two connecting rods with their bearings are eliminated. The crank shaft is necessarily much shorter and more rigid than a four cylinder crank shaft of conventional design. The general design of the motor is claimed to lend itself to simplicity, accessibility and compactness.

The cylinders are cast in pairs, with onehalf of the crank case cast integral with each pair. Thus, the four cylinder motor comprises only two castings, which are joined in the centre plane of the motor. The three crank shaft bearings are located between the two castings. As the valves are located in chambers on the upper side of the cylinders, the cam shaft is placed above the crank shaft in a removable frame, which is enclosed by a cover, and all working parts are protected from dust, etc. The motor is operated on moderate compression and is provided with a flywheel of generous diameter and weight. The use of large valves and a large flywheel is said to allow of throttling the speed down to as low as 60 r. p. m., and, on the other hand, to run it up as high as 2,200 r. p. m. All the castings are produced in the foundry of the manufacturer.

The cylinders are first rough bored and are then heat treated and "aged" to relieve



PLAN OF CHASSIS.



MULTI UNIT VEHICLE MOTOR.

all strains, after which they are finished by grinding. The pistons, which are cast in pairs, are also heat treated, after which they are ground to a perfect fit. The ring grooves are cut with a special tool to insure the greatest degree of gas tightness. The piston pin is secured in the piston by a positive locking detent or dog.

The connecting rods are made of vanadium steel and are provided with a hinge joint at the crank end, and with shims to facilitate the taking up of wear. The crank shaft is made from a drop forging which has the flange to which the flywheel is secured forged integral with it. The crank pins and main bearings are said to be of larger diameter than ordinarily used, and all bearings surfaces are ground. The bearing journals are drilled for oil. The bearings are lined with Parsons white bronze, the bushings being die cast and interchangeable. The outer bearings are provided with oil-retaining grooves and felt dust washers.

The valves are of the combination nickel steel head, carbon steel stem type. They have 45° seats and are interchangeable, all valves being mechanically operated. The cams are integral with the cam shafts, which latter are hardened and ground and are driven through bronze and steel gears. The push rods are of steel, hardened and ground, and provided with hardened steel adjusting screws. A shaft for the timer extends vertically at the side of the motor, and is carried in ball bearings and driven by a pair of enclosed bevel gears. An oil pump is provided in the crank case which keeps the oil in the crank case for splash lubrication at a constant level. Oil ducts are cast integral with the cylinders, and regulating check valves are provided so that the oil feed to the cylinders may be adjusted at will. The manufacturers claim that the motor is economical in the use of both fuel and lubricating oil.

The Woodhull Carriage Company, of Dayton, Ohio, is considering the manufacture of automobiles.

# A New Heinze Magneto.

The Heinze Electric Company, Lowell, Mass., has just brought out a high tension magneto which embodies some decidedly interesting features. The accompanying illustration gives a good idea of the external appearance of this magneto, which is of the low tension armature type, with step-up coil. dashboard mounted.

Special attention is paid to the field construction in view of the following considerations: The voltage generated by any magneto is proportional to the product of the total magnetic flux which is reversed through the armature core, the angular speed of the armature and the number of conductors thereon. Magnetos are now required to generate a useful sparking voltage at a very low angular velocity, so that they may start the engine when it is cranked and fire the charges positively at very low idling speeds. The speed factor in the voltage formula must thus be kept very low. The number of armature conductors must be kept low for various reasons. If a large winding space be provided, it is at the sacrifice of the iron cross section in the armature core, which leads to high magnetic reluctance therein, excessive leakage, and a diminution of the effective flux to be cut by the windings.

As a result of these considerations the closest attention must be paid to increasing the available field strength. This may be accomplished by the use of a large number of large field magnets, but this is commercially out of the question, as the bulk and weight of the magnets must be kept down within reasonable bounds. The desired result may also be accomplished by the use of magnets of reasonable size and weight, if the reluctance of the magnetic circuit be kept low and the leakage factor be minimized.

It is along this line that the Heinze magneto has been designed. It has been realized that a large proportion of the total reluctance of the magnetic circuit resides in the magnetic joints and in the air gap, and that very large contact

areas, close fits, and large flux areas are essential. Since the reluctance of two given magnetic joints, equally perfect mechanically, is inversely as the contact areas, very liberal contact surfaces are provided, and, since the reluctance of an air gap is also inversely proportionate to its flux surfaces, liberal polar areas are provided.

Instead of using magnets of conventional, flat, rectangular cross section, magnets of circular cross section are here employed, for several reasons: Steel of this section is less liable to crack in the hardening process, magnetic leakage is reduced, as there are no corners or portions of high radius of curvature, and, further, an improved method of jointing to the pole pieces is made possible.

Four U-shaped magnets of circular section furnish the field, and the ends of each magnet are ground to a uniform taper. This taper exactly coincides with the form which is given the holes in the pole pieces, which are to receive the magnet ends-a special reamer being employed. The magnet ends are forced into these holes under pressure and it is to be noted that the whole perimeter of the magnet end is in magnetic contact with the pole piece. This is not the case when rectangular magnets, having one side only pressed against the pole piece by the tension of one or two small machine screws, are used. In the case of fields having superposed magnets of rectangular section, the contact of the outer magnet with the pole piece is even less intimate, as the flux which it creates has two air gaps to overcome before reaching the pole piece.

Pole pieces of cast iron are used and the polar arc is large. The armature core is of somewhat unusual construction and material. Cast iron is employed, the usual laminated construction being discarded. Repeated tests have demonstrated to the satisfaction of the Heinze Company that the solid armature gives better results than one built up from stampings. While the cross section of the armature is roughly of shuttle shape, the slots are very much shallower than usual, leaving the main body of the shuttle of very much larger section. The horns of the ends are not as abrupt as usual, but are much more "stocky." The effect of this design is to reduce the reluctance of the armature core, which runs between the pole pieces, with a minimum clearance. Furthermore, the shape of the armature horns is such that the lines which pass through the iron always have a straight path, and are not abruptly bent. To this point of design is attributed the fact, which can easily be demonstrated by trial, that there is little variation of torque observable in turning the armature over. The shallowness of the wire slots is understood to be more than compensated for by the resulting low reluctance of th earmature core. Although but a fraction of the usual number of armature turns are employed, it appears that the increased activity per turn, due to the larger number of lines cut, more

than makes up for the reduced number of conductors.

So high is the conductivity of the magnetic circuit that it is the practice of this company to work their magnets at a somewhat lower degree of saturation than that ordinarily used. It is a well known fact that the lower the flux density the greater the permanence, other things being equal. The claim is made that the magnets used will not deteriorate more than 5 per cent. in 50,000 miles of running.

Magnetic leakage from the pole pieces is minimized by carefully rounding all corners. The armature shaft, with its cam, is carried upon annular bearings, and its driven end is furnished with a pin which works in the helicoidal slot of the driven sleeve which carries the universal joint. The advance and retard are obtained by a bell crank lever which moves the sleeve relative to the shaft, and thus changes the angular position of the armature shaft with relation to the magneto shaft of the engine. The regularity of the magneto torque referred to above allows this to be done without wear or strain upon the shifting mechanism. A total advance of 90 degrees is provided, but the break of the primary circuit is always at the peak of the voltage curve, which oscillograph determinations show to be very abrupt. By thus producing the spark at the maximum point low idling speeds of the engine can be taken care of. The make and break mechanism is of the roller actuated type, with all parts hardened, and the contacts are of platinum-iridium, and very liberal in size.

A round, radial gauze brush serves to collect the armature current, and a similar brush bears upon the shaft and positively grounds it. The make and break box is fixed in position, but may instantly be detached by the removal of two screws. It and all other parts are waterproof. The two primary cables coming to the break box are permanently fixed to their substantial contacts by soldering, and will be made of

any specified lengths. This does away with binding posts.

Just above the armature is located the condenser. It is of the "rolled up type," of mica and tinfoil, and is housed in a watertight removable brass casing. Its location at the magneto considerably simplifies the wiring required.

The following figures are given out as to the performance of this magneto: At 1,000 r. p. m. the primary voltage is 6.8 and its short circuit current amounts to 5.7 amperes; at 50 r. p. m. the magneto will produce a spark three-eighths of an inch in length.

The distributor gears are housed in a steel casing, and the distributor shaft is on annular ball bearings. For the distributor itself a sort of unit construction is employed, the distributor sections, in the form of triangular vulcanite units, being grouped in line on the shaft. The number of sections used corresponds with the number of engine cylinders. Each section carries a contact molded into its upper internal surface, to which its appropriate cable is permanently attached, the cable length being made as specified. All cables leave the distributor from the top. and if the order of cylinder firing is specified they can be so arranged that there need be no crossing of cables.

For each distributor section the distributor shaft bears a contact arm which travels in close proximity with, but does not touch, its corresponding fixed contact. The production of metal dust, with its liability of short circuiting, is thus avoided. The conformation of the distributor sections, which are of a special heat resisting, vulcanized rubber, is such that there is no possibility of a discharge from one to another, with its liability of producing a back fire. Connection from the high tension side of the dashboard coil to the insulated distributor shaft is by a heavy cable and a substantial contact. The distributor is readily accessible, and the construction is such that by changing the angular relation of the moving contacts upon the shaft any order of firing and any desired spacing may be attained.

The step-up coil used with this magneto is of standard Heinze construction, save that it has two primaries of appropriate winding for the magneto and for battery current, respectively. In the battery primary is included a regular Heinze vibrator. When the switch, which is of standard Heinze type, is thrown on "battery," the vibrator acts and the secondary current is distributed by the magneto distributor for starting purposes. When the switch is thrown to the "magneto" position, the battery circuit is interrupted and the magneto primary circuit made.

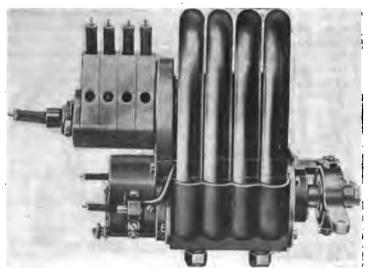
These magnetos are made with bases to fit any engine bracket and for motors of any number of cylinders, both four and two cycle. The weight of the machine is given as 20 pounds.

## New McCue Floating Axle.

The McCue Company, of Hartford. Conn., have made a number of changes in their floating type of rear axle for the 1910 season. A line cut of the new design is shown herewith. It will be seen that the axle comprises a steel housing which is welded laterally, with openings in front and back. The front opening is covered by a steel dome which is integral with the torsion tube extending forward to a bracket attached to a cross member of the frame. the same as on the latest style Fiat axles. Fitted into this dome is the differential gear case, which is supported by the rear cover, which is bolted to the axle housing. All revolving parts are carried on annular ball bearings, and self seating thrust bearings of ample dimensions are provided to take up the end thrusts. The rear axle driving shafts are made of .45 carbon steel, heat treated, with the hub clutches forged integral, not welded. The hub flange and the bearing surface of the large drum are







Heinze Low Tension Magneto.

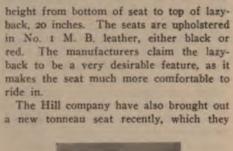
accurately machined, making it possible to assemble the wheels so as to run perfectly true. The hubs are provided with two brake drums of 10 and 14 inches diameter respectively. Both sets of brakes are of the expanding type, being operated by cam shafts

extending under the frame and connecting in a direct line with the equalizer bars. The brakes can be adjusted by means of the small cam shafts at the rear of the axle, which make a very simple adjusting means. The spring seats are made either to key on to the axle or to swivel, as desired. The axle shown in the illustration is designed for cars weighing 2,500 pounds or less. For heavier cars another

axle of the same type is being brought out which comprises a larger housing, larger gears and a larger size of bearings.

# Hill Folding Back Rumble Seat and New Tonneau Seat.

A rumble seat with a folding lazyback, as shown in the accompanying cut, is manufactured by the Hill Manufacturing Com-





Lazyback folded.

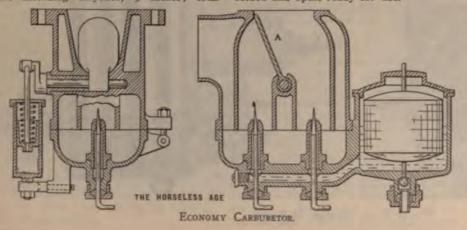


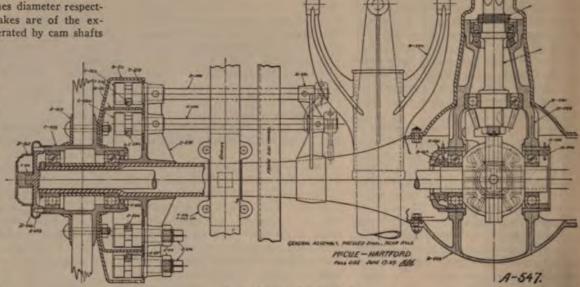
Open.

HILL RUMBLE SEAT.

pany, 25-27 Fuller street, Buffalo, N. Y. The seat has a spring cushion and is of the following dimensions; Width, 17 inches; depth, 16 inches; height of back of seat, not including lazyback, 9 inches; total

refer to as their No. 15 seat. This seat folds up more compactly than their No. 18 seat, and also sells at a lower price. The accompanying cut shows the seat both folded and open, ready for use.





NEW McCue Rear AxLE.

The seat is fastened to the side of the body on top of the sill. The socket has a 3% inch square hole through it, tapering to 5% inch at the bottom, thus insuring a good fit. The cushion is round and 13 inches in diameter, and the back is 17 inches



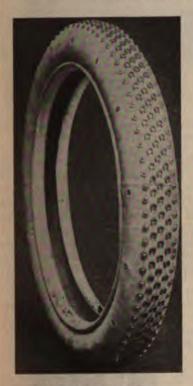
HILL TONNEAU SEAT, high. The seat has spring cushions and is trimmed in No. 1 M. B. leather.

# The Economy Carburetor.

Albert T. Otto, of 1876 Broadway, New York city, the American sales agent for Saurer commercial vehicles, has recently placed the Economy carburetor on the market. This carburetor is covered by patents owned by the Saurer company, and is used in the Saurer commercial vehicles, which made such a good showing in the recent competition held by the German Imperial Automobile Club. This carburetor has two nozzles, one of which works continuously, the other coming into action when the depression in the inlet pipe is sufficient to lift the clack valve A off its seat. This valve is retained on its seat by an adjustable coiled spring, which is enclosed by a dash-post, in which a plunger slides to prevent the valve from opening and closing too quickly. Each nozzle is provided with a needle valve adjustment, and all of the air taken in by the engine must go past the nozzles, there being no auxiliary air passages.

The "Horse Shoe" Tire.

he Beebe-Elliott Company, of Racine ction, Wis., are marketing a new ther pneumatic tire with a special m of renewable rivet washer. The conaction is plainly shown in the accomying photograph. The tread of the tire provided with two outer rows of plain flat headed steel rivets, and with middle s of rivets with "horse shoe" washers. e greater part of the road wear, of rse, comes on these middle rows. The se shoe shaped washers are originally de in the form of a U, which permits slipping them under the regular rivet ds. The washers are then closed by ding the ends together, and then form up into which the road dirt packs hard country roads. It is claimed that the t which fills these cups takes much of the ar from the metal, and that the combi-



THE HORSE SHOE TIRE.

tion gives much longer service than the dinary stud. When the cups become too ich worn to hold dirt, and when the et heads within them begin to wear, the els of the horse shoes may be spread and horse shoes taken out and new ones t in their place. It is stated that this ocess of renewing the washers can be acimplished at the rate of one per minute. special tool to open and close the washer furnished with the tire.

New Light Motor.

The Requa-Coles Company, of 206 oadway, New York city, are developing new light weight high speed internal comstion engine suitable for automobiles and ronautic use. The motor operates on the ur cycle principle, and because of a scanging puff of pure air introduced at the d of the exhaust stroke the motor is said to be much more flexible and more powerful than the conventional type of four cycle engine. Hugo C. Gibson is acting as consulting engineer for the company.

# Hupmobile Factory Nearing Completion.

The Hupp Motor Car Company, of Detroit, is completing the removal of its equipment and the instalment of new machinery in its new factory at Concord street and Jefferson avenue. The site of the new building adjoins the first automobile plant built and operated in Detroit-the former Olds works. With the exception of the part facing Jefferson avenue, where the office will be housed, the building will be one story high, and all the work will be done on the same level. The building has the shape of a huge capital U, each of the wings being 350 feet long and 50 feet wide, with the connecting portion 131 feet long and 60 feet wide. The building of cars will begin at one extreme end and the work will progress through the building until the cars are completed and ready for shipment at the other end. The capacity of the new factory will be 25 completed cars a day. Of the men connected with the company, R. C. Hupp, C. D. Hastings, E. A. Nelson, C. H. Dunlap and J. H. Peterson, are all former Olds men, and all entered the industry when the Olds factory was located on Jefferson avenue. J. Walter Drake, a Detroit attorney, is president of the Hupp Company.

New Wisconsin Auto Manufactur-

ing Company.
The Badger Automobile Company, of Columbus, recently organized with \$50,000 paid-up capital, and \$100,000 capital stock, has elected the following officers: President, A. M. Bellack; vice president, C. Kurth; secretary, George Holtz; treasurer, J. R. Wheeler; directors, Messrs, Bellack, Kurth; Holtz and William C. Leitsch. M. R. Arbogast, designer of the "Badger" car, which will be manufactured by the company, has been elected general manager of the company. C. Kurth is president of the Kurth brewing interests. General Manager Arbogast has returned from the East, where he purchased such parts as will not be manufactured by the company. The company plans to manufacture 250 cars for 1910 delivery.

New Factory for Edmunds & Jones.

The Edmunds & Jones Manufacturing Company, lamp makers, of Detroit, have found it necessary to provide larger manufacturing facilities, and about the first of September will move into a new factory located at 432 to 456 Lawton avenue. The factory building will be of brick and concrete, 60x215 feet, three stories high. In addition there will be a modern power plant, 40x58 feet. The new location provides shipping facilities over the Lake Shore, Michigan Central and Grank Trunk railroads. Ample land for further additions has been secured. Present plans include the manufacture of a full line of oil, acetylene and electric auto lamps, and an increasing production of marine lamps.

New Body Factory in Detroit.

The Griswold Motor and Body Com-pany has recently begun business in Detroit, Mich., in a factory building at Com monwealth avenue and the railroad, which is 90x110 feet in dimensions. The officers of the company are: H. F. Marsh, president; M. Griswold, vice president; A. F. Marsh, treasurer; Louis Smith, secretary and general manager, and Elmer E. Day. superintendent. The company starts with twenty-five hands, but plans to immediately start work on a 42x85 foot addition, and to greatly increase its force before winter.

Cole Motor Car Company Sales

Arrangement.
The Cole Motor Car Company, recently organized to take over the automobile manufacturing business of the Cole Carriage Company, Indianapolis, states that the entire output will be handled by the Henderson Motor Sales Company. Those interested in the sales company are J. J. Cole, Indianapolis; Charles P. Henderson, formerly with the Henderson-Hull Company, Savannah, Ga.; H. C. Lathrop, until recently manager of the Indiana branch of the A. D. Baker Company; Dr. A. B. Lathrop, of Swanton, O., and Leonard Carter, of Jessup, Ga.

Schweppe & Wilt Incorporated. The firm of Schweppe & Wilt, corner of Meldrum and Champlain strets, Detroit, Mich., has been incorporated as the Schweppe & Wilt Manufacturing Company, with a capital stock of \$70,000 and the following officers: President, W. H. Schweppe; vice president and general manager, A. D. Wilt, Jr.; secretary and treasurer, Marvine Gorham. The company has purchased considerable machinery from the old Pope-Toledo plant. The firm manufactures a line of automobile parts.

Tire Prices Rise.

A circular sent last week to automobile manufacturers all over the country announced an advance in the price of tires of from 15 to 25 per cent. The tire manufacturers' branch of the Motor and Accessories Manufacturers recently held a number of meetings in Cleveland and Akron, Ohio, at which the subject was discussed, and an increase in prices was decided upon to take effect on July 9.

The Aero Club of Michigan.

Under the above name a society has just been organized in Detroit for the encouragement of all branches of aeronautics. William E. Metzger is the temporary president, and many other local automobile men are among the charter members. The list includes such well known names as B. F. Everitt, H. E. Coffin and C. F. Splitdorf.

# Electric Lamps for Automobiles.

By MARTIN P. RICE.

Electric lamps have two important advantages for automobile lights which ought to insure their universal adoption. The first is safety and the second is convenience. The increased speed of gasoline driven vehicles under conditions and upon roads designed for horse traffic involves a sufficient element of danger without introducing the risk of fire from oil or gas lamps. While not, perhaps, so vitally important as safety, convenience is an advantage not less appreciated by all users of automobiles. Stopping to light up is sometimes annoying, particularly on a windy night, and the regulation of generators, gas tanks or oil wicks is usually more or less of a nuisance.

All this is avoided by using electric lamps. They eliminate flame and inflammable material. They are lighted and extinguished instantly by a switch within easy reach of the driver. For cleanliness they are unsurpassed. They produce no soot or smell, and there is no oil to leak or collect dust. There is practically no heat, so that the silvered mirrors cannot be damaged. The interior surfaces of lanterns fitted with electric lamps stay bright and clean. The electric system involves no difficulty in summer or winter; in fact, it is ideal for automobiles.

#### LAMPS.

The success of the system depends, however, upon the selection of suitable lamps and batteries, and upon their proper installation. Carbon filament lamps, because of their low efficiency, would require a battery of almost prohibitive size and weight, but tungsten lamps can be operated from batteries of reasonable weight and dimensions.

The filaments of these lamps for low voltages are short and strong enough to resist the jar and vibration incident to automobile service. No special spring support is necessary, and regular sockets can be used. Usually 6 volt lamps are employed, because this is the common voltage of ignition batteries, but 8 volt or 4 volt lamps may be used if preferred. The following equipment of tungsten lamps has

been found suitable for a touring car or runabout designed for town and country use: Headlights, two 10 to 20 candle power; side lights, two 2 or 4 candle power; tail light, one 2 candle power.

The filaments of headlights must be of compact form, so that the light is concentrated practically at a point which may be adjusted to the focus of the mirrors. If the filament is not compact, light is wasted by scattering. Several leading manufacturers of automobile lamps are now making brass lamps with reflectors and sockets adapted to electricity, but usually they are designed for lamps with miniature base (diameter three-eighth inch, length onehalf inch), which are entirely unsuitable. The headlights should be fitted with standard Edison screw bases (diameter 1 inch), and the side and tail lamps with candelabra bases (diameter seven-sixteenth inch,



Adapter for Changing from Kerosene to Flectricity.

length five-eighth inch). Some headlights originally designed for acetylene can be modified for electricity, but great care must be taken to adjust the position of the electric lamp so that a suitable beam of light will be reflected upon the road. A slight change in the position will make a remarkable difference in the results.

Side lamps and tail lamps designed for



BATTERY FOR LIGHTING AND IGNITION.

electricity may be much simpler in form and construction than lamps for kerosene, and while the latter may be adapted to electricity they include unnecessary parts, such as burner and oil reservoir.

#### BATTERY.

Tungsten automobile lamps will have satisfactory life at an efficiency of 1 watt per candle. On this basis the required battery capacity may be readily calculated. Two 16 candle power headlights, two 2 candle power side lights and one 2 candle power tail light require about 38 watts, or, with a 6 volt battery, the current will be about 6.3 amperes. A 100 ampere hour battery will supply all these lamps continuously for fifteen hours without recharging. The lamps are so readily turned on or off that motorists will generally not use the headlights except outside of town, and the side



SIDE LIGHT.

lamps can then be extinguished. The number of hours of service with one charge will thus be considerably prolonged.

The battery is also available for engine ignition. It may be recharged on any direct current system, or from an alternating current system with a mercury rectifier, or any device used for charging ignition batteries.

An electric system of automobile lighting requires much less weight in battery than is commonly supposed. A 100 ampere hour battery weighs 55½ pounds, but it replaces the ignition batteries weighing



HEADLIGHT.



SIDE LIGHT.

TAIL LIGH

TUNGSTEN AUTOMOBILE LAMPS.

probably 25 pounds and a gas tank weighing 30 pounds.

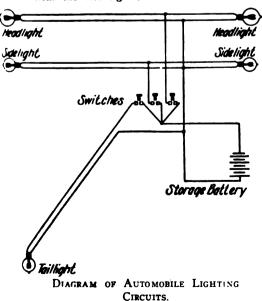
#### WIRING.

The lamps should be connected on three separate circuits, one including the two headlights, another the two side lamps, and the third the tail light. This arrangement permits the use of headlights and tail light for touring where the side lamps are not required, and in the city the side lights and tail lamp can be used without the headlights. The wire must be heavy enough to carry the current without appreciable drop in voltage, and should be connected to the battery through a suitable fuse. Wire-



HEADLIGHT.

men are liable to overlook the fact that low voltage lamps are very sensitive to a drop which would be entirely permissible with 110 volt lamps. The battery leads and wires leading to the headlights should have a cross section of not less than 10,000 circular mils (No. 10, B. & S.). The wire for side lights and tail lamp may be smaller -say 4,000 circular mils (No. 14, B. & S.). Flexible wire should be used, and on expensive cars it may be enclosed in brass piping so as to entirely eliminate any possibility of damage from short circuits. A short length of rubber tubing should be used, however, to connect the brass pipe with the headlights, as otherwise the vi-



TAIL LIGHT.

bration may cause trouble. If a car is carefully wired with well insulated wire, it will be perfectly safe without the brass piping, which, of course, adds considerably to the expense.

As previously stated, the headlights should be fitted with standard Edison screw sockets (I inch diameter), and the side and tail lamps with candelabra sockets (seven-sixteenth inch diameter). The miniature sockets (taking a base of three-eighth inch diameter) frequently used for this purpose are entirely too small to carry the current and withstand the vibration. The switch must be adapted for at least three separate circuits, and it should be conveniently located on the dash within reach of the driver. Additional circuits are a convenience for a small lamp over the speedometer, a portable trouble lamp (4



Four Circuit Switch for Automobile Lighting.

candle power), and a lamp of about 2 candle power conveniently located for the inspection of maps or road books. Switches of the type shown in the illustration are made up for various circuits from one to four.

# COST.

The cost of equipping a car with electric lamps depends, of course, upon the material selected and the charges of the wireman employed. The following will serve as a rough approximation:

One 100 ampere hour 6 volt battery	\$35.00	
One battery box for running board	5.00	
Two 16 c. p. 6 volt tungsten lamps	1.00	
Three 2 c. p. 6 volt tungsten lamps	1.50	
One three or four circuit switch	1.50	
Fifty feet twin conductor	2.50	
Wireman's time, one day	3.00	
,	\$40.50	

The cost of brass lamps has not been included in the estimate, because it is substantially the same as for gas and oil lamps.

The cost of two standard and three can-

delabra sockets, which will be required if gas or oil lamps are modified for electricity, is about \$1.50.

#### SUPERIORITY.

The small 2 candle power tungsten side and tail lamps will give a brilliant light never seen in kerosene lamps, even when new, and as there is no soot or heat to damage the glass and reflecting surfaces, and no deterioration, the brilliancy will be permanent. Electric lamps cannot blow out. The 20 candle power tungsten headlights, when properly adjusted with reference to the mirror, will fully equal the best acetylene lamps.

For safety and convenience electric automobile lamps are unsurpassed, and will speedily be included by manufacturers as part of the standard equipment of all high grade cars. They are equally advantageous for motor boat lighting.

# Convention of Maxwell Branch House Managers.

The 1909 convention of the district supervisors and branch house managers of the Maxwell-Briscoe Motor Company went into session on July 13 at New Castle, Ind., where the largest of the company's factories is located. Most of the delegates arrived from Detroit, where they had gone to attend the festivities incident to the start of the Glidden Tour. The party left Detroit on a special train of the Big Four, stopping for luncheon at Springfield, Ohio. The first day's session was attended only by district supervisors and district managers, and the discussion included the selling policy of the company for the coming season. After the first day's work the Maxwell men were the guests of the city of New Castle, which had prepared an elaborate entertainment at the Country Club, otherwise known as the Nip and Tuck Club. Fireworks, band concerts and general jollification at Maxwell Park were attended by some five thousand New Castle inhabitants. In the second day's meeting Maxwell dealers also took part.

## Weston-Mott New Building.

The Weston-Mott Company, of Flint, Mich., has decided to erect another new factory building for the manufacture of automobile rims and hubs. The building will be 500 feet long by 75 feet wide, and two stories high, which together with the basement gives an aggressive floor area of 110,000 square feet. The company located in Flint about three years ago, removing there from Utica, N. Y. It now employs about 1,000 men, and after the new addition is completed it will give employment to about 1,600.

# New Detroit Company to Produce Cheap Runabouts.

A new company has been organized in Detroit, to manufacture a \$500 runabout. It is known as the Demotcar Company, and has offices in the Bailey Building, on Twenty-first street.

# COMMUNICATIONS



## Exhaust Horns.

Editor Horseless Age:

Along with the development of the automobile engine it is interesting to note the different devices for utilizing the exhaust for signal blowing.

These devices may be divided into two classes—those attached between engine and muffler and those attached in the rear of the muffler. Up to very recently the former type prevailed, principally because of the persistent idea that only forward of the muffler could there be secured an exhaust sufficiently powerful to sound a horn under all conditions of speed.

Another factor that has prevented, or at least discouraged, the use of rear of muffler exhaust signals has been the marked variation in the type of muffler used by different makers—some delivering a powerful exhaust at the end of the rear exhaust pipe, while others almost entirely vitiated the power of the gases.

While the foregoing has been an obstacle in the manufacturer's path, the car owner has cherished his own objection, namely, that at low speed, such as would be used for city driving, there was not force enough to the exhaust to sound the signal, however well it might operate at higher speed on country roads.

This condition was due entirely to the fact that the manufacturer of signals was trying to make one size of signal serve for all sorts of cars, from one cylinder to "big sixes." Obviously this was futile, to say nothing of the attempts to adapt one horn to all types of mufflers.

More recently one manufacturer had the perception to bring out four graduated sizes of a unique type of rear of muffler exhaust horn. Some one of these four sizes adapted itself to any sort of car where the construction allowed room to locate the device. As was to be expected from previous experience, too small a size, while operating nicely at low speed, either shrieked or "blew out" at high speed. The reverse was true of too large a size, which gave a pleasing, far reaching tone at high speed, but failed altogether to sound at low speed.

This clearly proved the necessity of adapting the size of horn to the action of the exhaust on a given car. The normal horn uniformly gave excellent results at all speeds.

Right in the midst of this consideration the question naturally arises, Why use the rear of muffler exhaust horn at all?

The answer lies in the very considerable expense of the cut-out device into which the between engine and muffler types of signals are screwed, the large item of time

and labor involved, and the frequently necessary marring of the car.

Another serious objection to some makes of the cut-out type of signal is clogging by particles of carbon to such a degree that the sound ceases entirely or is weak. This feature necessitates taking apart and cleaning the device.

This trouble is not, however, a feature of all the cut-out signals. For instance, the very type referred to above as having been successfully adapted to use in the rear of mufflers was modified by the manufacturer to use in connection with the cut-out devices.

The construction of both is such that it is quite impossible for carbon particles to clog them.

This advance in the use of exhaust blown horns at least gives the motorist a choice, and with a tendency to standardize parts the rear of muffler type will doubtless be more and more in favor as time goes on.

H. L. H.

# Queries.

Editor Horseless Age:

What is meant by special hardened air furnace iron for cylinder castings?

Can any material other than cast iron be used for cylinders? Could steel tubing or steel castings be used to advantage building a light weight motor?

Why are marine motors operated at slower speed and built so much heavier than auto motors?

[The air furnace is distinguished from the blast furnace in that the fuel whose combustion melts the iron, instead of being mixed with the broken pig iron, is entirely separated from it. The iron is placed in a retort and is melted by applying heat to the retort externally. The term "special hardened" means presumably what it says. We have, of course, no means of telling how this special hardening is accomplished.

Steel cylinders have been used for racing motors, but were given up again. It is very difficult to make a permanently water tight joint between a steel cylinder and the jacket, and the bearing properties of the steel are not as good as those of cast iron. The unequal expansion of a cast iron piston and a steel cylinder is another disadvantageous feature. The consensus of opinion at present seems to be that for motors that have to operate continuously, that is, for service motors, cast iron is the best cylinder material, all things considered.

That marine motors are built to operate at lower speed than automobile motors is largely due to the fact that motor boat owners are not as much possessed with the speed craze as automobile owners. A slow speed motor will last longer than a high speed motor, but if you wish to be able to pass everything in sight, whether on the road or on the water, you must perforce use a high speed motor, because such a motor weighs less than a slow speed motor, and therefore does not need such a heavy support (running gear or

hull). For commercial vehicles, which are not required to run at high speed, low speed motors are also coming to be used. There is one other reason, however, why automobile motors should be run at higher speed (and so made lighter) than marine engines. The automobile engine and its supporting frame are carried on pneumatic tires, which are very sensitive to weight, their rate of wear increasing rapidly with the degree of loading. There is no corresponding increase in wear and expense with increase in weight in the case of motor boats.—ED.]

# Elevating the Chauffeur's Calling. Editor Horseless Age:

The exact status of the chauffeur in a country like this, supposedly without class distinctions, is and has been a mooted point. and much discussed. While the large cities have developed a class of men like the old coachmen, to whose employers the imporance of wearing a livery well and saluting properly is greater than the ability to care for a machine, it is still true, I think, that the majority of chauffeurs throughout the country are a wideawake, elever lot of young men, who take their vocation seriously, and are entitled to a good place socially. When the personal equation makes it possible, they should be given the standing of men in charge of other expensive power plants, electricians, etc., and should be trusted as far as the individual proves he can be. In these days of more perfect machines, garages conveniently situated for repairs and better tire equipment, the average chauffeur finds more idle time on his hands than formerly, and there is where the employer can do most to benefit the man. Keep him at work as steadily as possible, encourage him to take an interest in studying his machine thoroughly and keeping it up to its highest efficiency, and take an interest in him as a man and a fellow citizen, and if he is any good you will improve him and he will take naturally the place in the social scale he is entitled to. If he isn't any good, try for a better one. There are many young men of good American families taking up the profession, and they should be encouraged by giving them opportunity for self improvement, and not discouraged by blaming the vocation for the scamps who are undoubtedly in it.

HENRY P. BENSON.

# Ignition Query.

Editor Horseless Age:

Can I successfully use two spark plugs and insulate the first one in the circuit from the engine and get a spark from both? Would the spark from the second one come in time to appreciably hasten the combustion if the plugs were set opposite in the firing chamber? Would there be any bad effect on the ignition system if this was done, or would the voltage or amperage have to be increased? C. L. EDWARDS.

[We presume that what you have in mind

nnect the two spark plugs in series. y the best plan of accomplishing this se a coil in which the secondary is not connected to the primary inside the coil, so that you can th ends of the secondary windsulated from the frame. You n use two ordinary spark plugs, and one end of the secondary winding sulated terminal of one of the plugs other end of the secondary windhe insulated terminal of the other The spark will then jump from the d terminal of the first plug to the d terminal, and from the grounded of the second plug to the insuminal of this plug, and then return coil. The two sparks occur simuly. The above connections are for cylinder engine, or where one coil ded for each cylinder, in case of a inder engine. This arrangement e easier to carry out than that sugby you, as to connect a spark plug e cylinder by means of a fitting of g material would entail consideraiculty. The two spark plugs in ould, of course, require a higher than only a single spark plug; in actically twice the voltage.-En.]

# Cleaning the Radiator.

HORSELESS AGE:

you kindly tell me what to use to e dirt and scale out of a radiator, amount per gallon?

S. K. SINGER.

lean the radiator of dirt and sedie whole of the water in the radiat be run out and measured, taking at no water is left which would e effect of diluting the solution. er is made by dissolving 21/2 pounds caustic soda so that it makes I galolution. Considerable heat is genwhen the soda is dissolved, and fretirring is necessary. After the licooled the radiator may be filled and it is left in all night and run he morning. Caustic soda will corminum and zinc, and if any part of ator is made of these materials it not be used. After running out the lution the radiator should be thorrinsed; by means of a hose conto a hydrant, for instance,-ED.]

## on Spring in Steering Gear. HORSELESS AGE:

you kindly tell me in one of your issues whether or not any patents en issued on a steering gear with a spring in the gear, to take the f the ball sockets and to act as a bsorber? Also what would be your of a gear of this type?

ALBERT BRAUN.

do not remember ever having seen into of a gear so cushioned, but say positively whether or not such has been patented, as this would a search of the patent records,

which we cannot undertake. We should think it to be considerably more difficult to incorporate a suitable cushion spring in the steering gear than in the ball and socket joints, and for this reason would not think as favorably of the plan as of that usually followed.—Ep.]

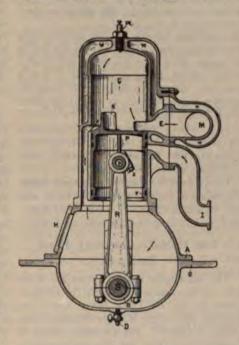
# Missing in Two Cycle Motor.

Editor Horseless Age:

I have a two cylinder, two cycle, three port valveless engine, 4½x4½ inches, of 15 horse power. The same runs very nicely under load at any speed from 100 revolutions up, but if I let it run without any load I notice constant misfiring and knocking, and sometimes if I change from high to low speed there is a crank case explosion. I have tried out three different makes of carburetors, and the trouble is the same with all. Will you tell me what the cause may be?

O. W. Brown.

[When the engine is closely throttled only a small amount of charge is transferred



from the crank chamber to the cylinder, and the scavenging effect is then much smaller than when the engine is operating at full power. A considerable volume of burnt gases remains in the cylinder, and as these gases are hotter and lighter than the new charge they will occupy the uppermost portion of the cylinder, where the spark plug is located, and the spark will then occur in dead gases and there will be no explosion. This trouble could be remedied, to some extent at least, by placing the spark plug in the side wall of the cylinder directly above the transfer port, and as low as possible without being struck by the piston.

Explosions in the crank case are liable to occur with any two cycle motor that has a direct transfer passage from the crank chamber to the cylinder. They generally occur when the mixture is for any reason unusually lean, as when the speed of the motor is suddenly pulled down. This trouble can be overcome by placing a screen of fine mesh wire gauze in the transfer passage. Of course, these changes are difficult to make in an engine already built, but if you have the patterns you can change them to allow making these alterations in the construction of the engine.—Ed.]

# Criticises the Block Motor.

Editor Horseless Age:

The first question is, what is gained by such construction, and do the defects disappear because some few concerns care to adopt it?

I consider that the practice is not based on good judgment from any standpoint. The extra risk in the foundry means much; a defect may develop that means that four cylinders have to be "scrapped," and this may occur at any place from the foundry to the user. A cut cylinder bore due to lack of care and proper lubrication means expensive repair bills. The practice of dispensing with inlet and exhaust pipes seems to me ridiculous, for several reasons. Take the inlet pipe. Is it possible to get a uniform charge in all four cylinders? With the front cylinder we have a gas heated by the exhaust gases from two cylinders, while the rear cylinder charge is heated by contact with the heat of all four, and no one of the four can be expected to receive the same amount of heat. Then, again, knowing that a large percentage of the total heat of combustion must pass off through the exhaust valves, why confine the gases after all the useful work is done? It will only tend to distort the cylinders by the unequal heat effects just referred to. The practice also requires the provision of additional radiator surface to absorb the heat that could otherwise be expelled in the usual way. I consider this subject well worth investigation. I am like many others, I want to be shown.

[You mention only the disadvantages of the block construction and do not say a word about the advantages, such as reduction in weight, greater simplicity, fewer joints, etc. We will not go into details, but will leave it to some champion of the block motor to draw attention to its various merits.—ED.]

# Relative Fuel Economy of Six and Four Cylinder Motors.

Editor Horseless Age:

Will a six cylinder engine use any more gasoline than a four cylinder of equal power? I have heard this stated so many times that "I ask to know."

What records have six cylinder cars made in any of the numerous economy tests held over the country?

BEVERLY B. HOBBS,

[There is exceedingly little data on this point, insufficient to warrant generalization. The only logical basis of comparison is the pound-mile or two-mile basis. In the earlier fuel economy contests the weight

of the cars with passengers was not taken into account. As regards these contests it is sufficient to say that none was ever won by a six cylinder car. In the One Gallon Contest held by the New York Trade Association in May of this year two six cylinder cars competed, viz., an Overland "38" and a Lozier "51." The pound-mile score of the former was 53,500 and that of the latter 89,433, making the average 71,467. If we take all the four cylinder cars of 24 horse power and over that competed in this contest we find that the average poundmile score was 67,620. Consequently the average of the "sixes" is somewhat better than that of the six "fours" of 24 horse power and over. According to this test, therefore, the six cylinder motor is more economical of fuel than the four cylinder, but, as stated above, a single test is not conslusive.

The supposition that six cylinder motors are less economical of fuel than four cylinder ones undoubtedly has its foundation in the fact that six cylinder cars in general have more power in proportion to weight to be moved than four cylinder cars, and must, therefore, be more closely throttled in traffic and wherever speed limits must be observed, and the more an engine is throttled the more wasteful of fuel it is. We believe that taking two engines of the same horse power, one six cylinder and the other four, but otherwise of identical design, then the fuel economy at full load will be practically the same for both. —ED.]

## Heating Private Garage.

Editor Horseless Age:

Will you kindly answer these questions in your valuable publication?

- I. Is it safe to heat a frame building, 18x24 feet, and used as a private garage, by means of a coal stove during the winter months, when doors and windows are closed?
- 2. If not, what is the danger, and how can I heat the garage so as to safely keep a gasoline car in it?

C. L. AMBOS, M. D.

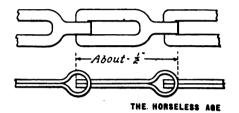
[It is not safe to heat a frame garage (or any garage) by means of a coal stove inside the building. There is always some danger of gasoline leaking from the car, and the gasoline vapor which would then form would travel along the floor and reach the stove and become ignited. It is quite conceivable that a slight leak may develop in the gasoline piping, during a drive, which remains unnoticed when the car is put in the garage, and an explosion would then almost be certain to result. The proper method of heating a small garage is by placing a heater (steam, hot water or hot air) in a separate room or lean-to outside the garage, and to put either steam pipes or hot air pipes in the garage. There must be no opening in the wall between the heater room and the garage, except for the pipes to pass through.—Ep.]

# New Method of Decarbonizing Cylinders.

Editor Horseless Age:

I have read a good many articles on "how to remove carbon" of late in your valued paper, and it occurred to me that I might submit a method I have been using for the past two years with good results.

Take the car, after it has been put away for the night, and put about two tablespoonfuls of coal oil into the cylinders and allow it to stand over night. Then, in the morning, procure some soft brass chain, as shown in the sketch, and cut off a piece not longer than twice the diameter of the cylinder bore minus I inch; fasten the ends with a piece of soft brass or copper wire and drop in



the cylinder on top of the piston, being careful to make it lie in a circle and not in a tangle. Now start the motor with everything regular, being careful not to run it too fast. About five minutes will clean the cylinder head and walls, as well as the piston head, in fine shape.

It is obvious this method will only work on vertical engines, and that it will only clean that part of the motor cylinder which is directly above the piston.

I have used this method on several different makes of engines and have never noticed any injurious effect. E. W. Jones.

# The E-M-F Company Buys De Luxe.

The latest large deal to attract the attention of the automobile world is the purchase of the De Luxe Motor Car Company by the Everitt-Metzger-Flanders Company, of Detroit. The De Luxe factory is situated at Clark and Jefferson avenues, Detroit. It is close to the water front and has splendid shipping facilities. The factory site comprises some 15 acres, about half of which is covered with buildings which have been devoted to the manufacture of the Car De Luxe.

The entire property of the company, including land, buildings, machinery, patents, drawings, tools and fixtures, is included in the deal. It is said that the purchase was for cash and that the price was somewhere between \$750,000 and \$1,000,000. Besides the property of the De Luxe Company the E-M-F Company purchased from Messrs. Kaufman an adjoining tract of about 4 acres, close to the new plant of the Timken-Detroit Axle Company.

The E-M-F Company will use their new purchase for the manufacture of a smaller car, which will be known as the "Studebaker-Flanders 20." Much of the present

equipment of the De Luxe factory will be suitable for this purpose, and the additional special machinery and materials necessary are already ordered. Indeed, plans for the manufacture of the new car are far enough advanced so that 150 men were put at work in the new factory last Friday.

Present plans provide for the production of 25,000 Studebaker-Flanders "Twenties" during the calendar year 1910, deliveries to begin Jauuary 1, 1910. The manufacturing equipment will be more complete than any yet installed in an automobile factory. The details of the new car have not yet been announced, but it is currently reported that it will have a "block" motor, will be furnished with a high grade magneto, and in fact with a high grade equipment throughout. The price will be less than \$750. Mr. Flanders states that the company will make a limited number of the Car De Luxe.

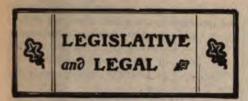
In connection with this new acquisition of the E-M-F Company, it may be well to state definitely the status of the company, which is somewhat confused in the minds of many in the trade. The E-M-F Company is wholly a manufacturing concern, and is under the direction of Walter E. Flanders, who is president. A large interest in it is held by the Studebaker Automobile Company, which markets the cars in all parts of the world, the present product being known as the "Studebaker E-M-F Thirty." Indications at the factory where the "Thirties" are made point to immediate extension in the manufacturing facilities, to take care of the increasing demand for these cars.

# Atlanta Show Plans.

S. A. Miles, general manager of the National Association of Automobile Manufacturers, arrived in Atlanta, Ga., on July 14, to make arrangements for providing increased space for the automobile show which is to be held in the Auditorium-Armory in Atlanta, November 6 to 13. Mr. Miles states that he has applications for twice as much floor space as is available in the Auditorium, and that steps must be taken to accommodate the would-be exhibitors. It is proposed to close Courtland street immediately in front of the show building and enclose the alley on two sides of the building to provide additional room. A petition to close the street is to be presented to the streets committee of the Atlanta council.

# Brush Runabout Plans.

The Brush Runabout Company, Detroit, Mich., has had plans prepared for a new factory building 871x150 feet, which is claimed to be larger than any single factory building devoted to automobile manufacture at present. The company plans to turn out 2,000 of its runabouts next year, and will make very few changes in design of the car. Orders have been given for \$80,000 worth of new machinery.



# Jail for Speed Maniacs.

In an endeavor to stop reckless speeding through the streets, the city council of Los Angeles has passed an ordinance imposing a straight jail sentence of at least ten days upon any driver of a motor car found guilty of violating the speed regulations, provided his machine exceeded 30 miles per hour. For a second conviction of speeding at 30 miles or more per hour the minimum penalty is thirty days, and for the third and subsequent convictions a sentence of 100 days may be inflicted. By establishing a speed of 30 miles an hour as reckless and dangerous driving the council, in consultation with representatives of the A. C. and the Los Angeles dealers, hoped to distinguish between motorists guilty of technical or lesser violations of the law and that class of drivers responsible for the average of five accidents per day that stirred up the agitation for the straight jail sentence. The speed limits were not reduced, but the minimmm fine for violations of the traffic rules was raised from \$10 to \$25.

While the new ordinance makes it imperative for the magistrates to impose a jail sentence upon drivers whose cars exceed 30 miles per hour, such sentences, in all probability, will be few and far between, and still fewer of those sentenced will serve their time. The usual difficulty of legally proving a high rate of speed will interfere. Besides, the city council so far has refused to purchase more and faster motorcycles than the two slow machines now in use by the police, and the chief of police has declined the offer of the A. C. to have 200 of its members appointed special officers. The chief was of the opinion that every driver arrested for speeding would display a star and explain that he was going fast in order to overtake and arrest another fellow.

# Legal Decision Regarding Motorist's Responsibility.

The question of the rights of motor vehicles on the public highways has been decided by C. L. Baldwin, of the Justice Court at La Crosse, Wis. The decision was given in the case of Edward Wimmer, a grocer, against Miss Mae Williams, to recover \$50 damages, and was in favor of the defendant.

The point involved was: How close to a horse, tied at the roadside, may a motor vehicle go without making the driver guilty of negligence in case of accident? The testimony showed that the car was being driven at a moderate pace, under its own momentum, the engine being dead, and when passing the horse was but 3 feet away from it. The horse broke away, but a bystander grasped the bridle. At this juncture Mr. Wimmer appeared and demanded damages

for the damaged piece of harness. The plaintiff's attorney set up the claim that as the car was as close as 3 feet to the horse the driver was responsible, this constituting negligence. Mr. Wimmer and other witnesses testified that the horse was "city broke" and not unusually frightened when near motor vehicles.

The case is so unusual that appeals will be made to higher courts to determine the correctness of the decision.

# Recent Decisions.

REAR COLLISION ON WELL LIGHTED STREET.

Where a wagon on the right hand side of the road was struck by an automobile from the rear, and the road was lighted sufficiently to enable the wagon to be seen for 150 feet, a judgment for damages was proper. The fact that the wagon carried no light was held immaterial.—Decou vs. Dexheimer, N. J., 73 Atl. 49.

QUESTION FOR THE JURY.

The negligence of a street railway company was held to be a question for the jury where a street car collided with an auto at a crossing, where the speed of the auto was not more than six miles an hour and the car was running under full headway without any signal.—Loomis vs. Brooklyn H. R. R. Co., 117 Supp. 292.

# A. C. A. in Uniform Law Movement.

President E. H. Gary, of the A. C. A. has appointed George F. Chamberlin, Colgate Hoyt, Henry H. Law and V. Everit Macy members of a committee to formulate plans for a conference between members of the State Legislatures of New York and the New England States to discuss uniform State laws. A plan is to be prepared which will embody suggestions of proposed uniform laws for presentation to the conference on uniform laws which has been called by President Taft to meet in Washington this year.

# New Jersey Physicians Not Exempt from Speed Law Requirements.

Physicians are not exempt from the requirements of the speed limit provision of the New Jersey automobile law. State Motor Vehicle Commissioner Smith has summoned Dr. Chas. Miller, of Riverton, to answer to a charge of driving his automobile at an unlawful speed. Commissioner Smith says that no physician has any right to a higher rate of speed than any other motorist. Should a physician respond to an emergency call at a high rate of speed his explanation would be listened to, but an explanation he must make.

## Opposition to Connecticut Bill.

Considerable opposition is being developed in Connecticut to the automobile bill recently passed by the Legislature of that State, and which is now awaiting the signature of the Governor. An effort is being made to induce the Governor to veto the bill. The Connecticut State A. A. has sent

out a circular letter in which various alleged defects of the bill are pointed out. It is held that the bill is full of errors and difficult to understand; that the scheme of taxation is unjust and that no penalties are provided for violations of various provisions, so that it would be impossible to enforce these. The provision of the old law which enables the owner to offer his car as security for bail is omitted in the new law, an omission which is strongly objected to by the motorists.

# Legal Notes.

The Mount Desert automobile exclusion act has been ratified by all of the towns on the island with the exception of South West Harbor, in which three automobiles are owned.

A test of the new Illinois State law is to be made by Dr. John W. Tope, Jr., of 150 Lake street, Oak Park, Ill. Mr. Tope's lawyers state that they have found serious flaws in the new law.

John C. Kaiser, of Jersey City, a former sheriff, has been appointed Jersey City agent of the State Motor Vehicle Department by State Automobile Commissioner J. B. R. Smith. Kaiser succeeds Joseph Gallagher, who was killed in an automobile accident on May 16 last.

Acting Mayor Patrick F. McGowan, of New York city, has vetoed the ordinance requiring municipal automobiles to be sign marked in large letters. The reason assigned by him is that such marking would interfere with the work of the police and health departments.

Coroner C. K. Henzler, of Toledo, Ohio, has given out a notice that hereafter if he is called upon to investigate the death of a person run down by an automobile that was driven beyond the speed limit, or because of the driver not exercising sufficient caution at street crossings, he will be justified in holding the guilty driver to the grand jury for criminal negligence.

An ordinance went into effect on July I in Charlotte, N. C., requiring automobilists to pay an annual city license tax of \$5, and chauffeurs a tax of \$1, and requiring all State licenses to be registered with the city treasurer. So far very few owners of cars in the city have complied with the ordinance, and there is said to be much opposition to it, it being claimed that the tax is unconstitutional, as it amounts to double taxation.

## Obituary.

George T. Robie, president of the Excelsior Supply Company, of Chicago, died in that city as the result of an operation for appendicitis on July 18. Mr. Robie was born in Walworth, N. Y., on March 26, 1853. He went to Chicago in 1873 and established the Excelsior Supply Company in 1876. Since then he had been prominent in the work of the Association of Commerce. He leaves a widow and one son, Fred T. Robie.

# Commercial Applications.



Motor Delivery Wagons for Indianapolis Library.

The Indianapolis Public Library is arranging to adopt automobiles for delivering books from the main to the branch libraries. At a recent meeting the Board of School Commissioners having the library in charge instructed John E. Cleland, business director, to obtain prices on such vehicles. Andrew Carnegie has contributed \$120,000 for the erection of six branch library buildings, which will make the present horse drawn delivery inadequate.

# Motor Mail Collection Test in Buffalo, N. Y.

Buffalo, N. Y.

Tests made by the Buffalo, N. Y., Post Office during the past two months are said to have shown that one automobile and one collector can collect as much mail as two horses, two wagons and two men, and Postmaster Greiner at the completion of the test, at the end of this month, will recommend to the department at Washington that the present collecting equipment, consisting of eleven horse wagons and horses, be replaced by five automobiles.

## Commercial Notes.

Hannes Lawson, a drayman of Rockport, Ill., has placed orders for two motor trucks.

An automobile service has been inaugurated between Allegan and South Haven, Mich. One round trip is made per day.

George H. Prouty, the proprietor of the last horse stage line in Massachusetts, on July I replaced his equipment with motor cars. The line extends between Petersham, Barre and other nearby points; it carries the mails and passengers, and has been in operation for nearly a century.

Arthur Kingery, a produce dealer at Mohawk, Ind., has had a special automobile delivery wagon built by an Indianapolis concern. He formerly drove an old time huckster wagon, going through the rural districts buying butter, eggs and other produce. The old vehicle has been discarded for the automobile, which he also uses for hauling his purchases to the Indianapolis market, thus saving freight bills.

The Atlantic City, N. J., police department has purchased a motor police patrol from the Olds Motor Works. The new patrol will have a capacity for twelve passengers inside and two on the front seat; will have a cage body and top, and be equipped with a four cylinder, 40 horse power motor. The wheel base will be 132½ inches, the wheels 36 inches all round, and the car will have a speed of 40 miles per hour.

Thomas Halloran, a rural mail carrier of Bennington, Vt., whose work requires him to cover a distance of 40 miles every day, some time ago purchased a motorcycle

for use on his rounds, but soon found that the time required to find a suitable place in which to stand the machine at each house where deliveries were required made the use of the machine inconvenient, and now Mr. Halloran has adopted the automobile. He is said to be the first rural mail carrier in Vermont to use the new means of locomotion.

# New York Taxicab Rates Cut.

Last Monday the New York Taxicab Company inaugurated a reduction in the tariff for its red taxicabs to 30 cents for the first half mile, and 10 cents for each additional quarter mile, for one to four passengers. This rate is the same as was charged when the red cabs were first put into operation. In the original announcement of the reduction in the newspapers. owing, it is said, to an error of an advertising agency, it was stated that a charge of 10 cents would be made "for each additional half mile" (instead of quarter mile), and this erroneous announcement caused quite a stir in taxicab circles, and led an independent cab owner to make the assertion that the company could not possibly live at such rates and would be obliged to raise the rates again after it had crushed out the independents.

# Cleveland Taxicab Consolidation.

The Citizens' Taxicab Company, of Cleveland, Ohio, on July 13, bought the stock, fixtures and good will of the Studebaker taxicab service. The Citizens' Taxicab Company will have its headquarters at 1004 Prospect avenue, S. E., where it will maintain its principal garage. A station will be established at Euclid avenue and East 105th street. The company now operates fifteen taxicabs, and promises to put on fifteen more soon. Six cabs were taken over from the Studebaker Company. The officers of the company are: S. W. Harding, president; J. H. Foster, vice president; Benj. A. Gage, secretary, and J. D. Ludlow, treasurer.

# D. M. Parry Organizes Auto Company.

An automobile factory is to be established in Indianapolis, as soon as buildings can be erected, by a company that is being organized by David M. Parry, a well known manufacturer of carriages. Until recently Mr. Parry was president of the Parry Manufacturing Company, manufacturing carriages, but resigned, retaining his interests in the concern.

It is probable that the new company, which will be known as the Parry Automobile Company, will have an authorized capitalization of \$1,000,000. The factory buildings alone will cost approximately \$100,000, and are to be erected as soon as a satisfactory site can be obtained.

Mr. Parry states that the cars to be manufactured will be known as the Parry, and

that for the first year the line will consist of two models, one a two cylinder runabout to sell at \$1,250, and the other a four cylinder, 30 horse power, five passenger touring car. Some of the machinery has been ordered, and the first cars will be ready for the market during the fall.

Mr. Parry is not unknown in the automobile field, having been one of those who reorganized the Overland Automobile Company, prior to its last reorganization, when J. N. Willys became president. It is understood that Mr. Parry disposed of his interests in the Overland Company some months ago.

#### Reo Plans.

The Reo Motor Car Company, of Lansing, Mich., is this year for the first time bringing out a four cylinder car. The cylinder dimensions are  $4\times4\frac{1}{2}$  inches, and the cylinders are cast in pairs. Among the other features of the new car are an I beam front axle, overhead valves, 108 inch wheel base, selective type of change gear, high tension magneto and a multiple disc clutch. The control of the car is on the left hand side. The company plans to turn out 10,000 cars during the coming season, including a number of the present two cylinder models.

#### Mitchell 1910 Models.

The Mitchell Motor Car Company, of Racine, Wis., will produce three models the coming season, viz., a 100 inch runabout, a four cylinder, five passenger touring car, and a seven passenger, six cylinder touring car. The cylinders of all the models are of 41/4 inch bore by 5 inch stroke, so all cylinders, pistons and connecting rods will be interchangeable. A magneto is a regular equipment on all cars. The motors all have overhead valves, and are said to be very quiet running. Among the special features of the new models are a tubular torsion bar, a straight line drive, a single universal joint, lower hanging of the body and a floating type of rear axle. The company is arranging for a production of 6,000 cars the coming year.

# Jackson Line for 1910.

The Jackson (Mich.) Automobile Company's line for next year will comprise three four cylinder models, selling at \$1,250, \$1,700 and \$2,250, respectively. The smallest car is rated at 20 horse power. The changes for next year include larger wheels and tires and a longer wheel base.

Oakland 1910 Output.

The Oakland Motor Car Company, of Pontiae, Mich., which is now controlled by the General Motors Company, plans to turn out 3,000 cars during the coming season, its line including a 20 horse power, two cylinder car, and a 40 horse power, four cylinder, the latter selling at \$1,700. Few changes will be made in the models for next year.

# MINOR MENTION



The Gray-Hawley Manufacturing Company, Detroit, Mich., will soon erect a new factory.

The Heinze Electric Company, of Lowell, Mass., have completed an extensive addition to their No. 1 plant.

The referee in bankruptcy for the Pneu l'Electric Company, New York city, has declared a first dividend of 5 per cent. on all allowed claims.

The Widmer Machine Works, of Detroit, will remove most of their plant to New York. Mr. Widmer will remain in Detroit to look after that end of the business.

L. C. Van Bever and H. H. Knepper have secured the agency for the New England States, with the exception of Connecticut, for the Standard Tire and Rubber Company.

It is reported that the Ford Motor Company, of Detroit, are now turning out their Model T cars at the rate of 450 to 500 a week. During the month of June 1,954 cars were shipped.

The Bosch Magneto Company, of New York, have recently secured additional space and reorganized and enlarged their office force to cope with the demand for magnetos for the 1910 season.

The new plant of the Rider-Lewis Motor Car Company, in Indianapolis, Ind., is nearing completion, and the company will begin in a few days to ship machinery from its Muncie factory to Indianapolis.

In our issue of June 30 the Lozier 45 horse power car was erroneously described as having cylinders of 51/6 inches bore by 53/4 inches stroke. The actual dimensions of the cylinders are 53/8 by 51/4 inches.

The Rapid Motor Vehicle Company, of Pontiac, Mich., has had plans prepared for an addition 670x60 feet in dimensions and another 300x60 feet. The company will install \$100,000 worth of machinery during the next four months.

A minor improvement in the 1910 Lozier models consists in an improved air pressure check valve replacing the old type of ball check, which latter required more or less frequent cleaning, due to the formation of carbon 'and consequent clogging of the valve.

The Boston Fire Department recently put into service another motor propelled fire wagon, the second of its kind. The vehicle is stationed in the same fire house as the first one, in the Roxbury district. The two motor wagons will cover the entire southern part of the city.

The New Departure Manufacturing Company, of Bristol, Conn., inform us that they are installing new machinery to meet the demand for New Departure ball bearings, for which they have recently taken several important contracts for 1910 models. They have been working a night shift for some time.

The Hupp Motor Car Company, of Detroit, are said to be planning to turn out 5,000 cars in 1910.

The Whitney Manufacturing Company, Hartford, Conn., are making a specialty of chains for heavy trucks.

The Empire Automobile Tire Company, of Trenton, N. J., has opened an agency in Atlanta, Ga., at 117 North Pryor street, in charge of J. H. Young.

Childs & Ralston have established a tire repair shop on Philadelphia's "Automobile Row." Both members of the firm were formerly connected with the Diamond Rubber Company.

The negotiations of the Pietsch Auto and Marine Company, of Chicago, Ill., with the business interests of Kalamazoo, Mich., regarding location of a company in that city, have terminated unsuccessfully.

William E. Marengo, 207½ Chandler street, Worcester, Mass., has invented a new cushion tire for automobiles. He has applied for a patent on the tire, and will begin its manufacture in Worcester.

The Grabowsky Power Wagon Company, of Detroit, Mich., has recently increased its capital stock to \$300,000, and is negotiating for a new factory site, but plans to retain its present factory on Champlain

The Griffith Motor Company has been opened for business in Flint, Mich., at South Saginaw and East Court streets. The company will manufacture gasoline motors for automobiles. W. G. Griffith is at the head of the concern.

President J. A. Wister, of the Automobile Trade Association of Philadelphia, has appointed W. J. Foss and James L. Gibney members of the show committee, to make arrangements for the show which is to be held by the association next winter.

The new models of the Harry A. Haupt Company, New York, are nearing completion at the factory of the Bristol Engineering Corporation, Bristol, Conn. The line will include a four cylinder, 60 horse power model, and a six cylinder model of the same cylinder dimensions. The four cylinder models are expected in New York by the 1st of August.

According to Judge W. W. Slabaugh, who recently spoke before the Omaha, Neb., Young Men's Christian Association on "Our Country and the Young Men," "everywhere men are mortgaging their homes so that they can spin along the roads and wear green goggles. The automobile means the disruption of many a home, I fear."

The Palmer & Singer Manufacturing Company have introduced a number of changes in the new series of their "Six-Sixty" cars. The new model is known as the LXII, and is equipped with a motor of 47% inch bore by 5½ inch stroke, which is an increase in size over the former motor. Among the other improvements are a force feed oiling system, with leads to each bear-

ing, 36 inch wheels, and a multiple jet car-

Hack drivers of Montreal, Canada, have petitioned the police committee to prohibit the importation of taxicabs.

The tire manufacturers' branch of the Motor and Accessories Manufacturers will hold a meeting in New York city on July 27.

E. T. Birdsall, M. E., agent for Selden cars for Yonkers, N. Y., and Greenwich, Conn., has changed his address to 2230 Broadway. New York city.

John Heber, formerly of the Bates-Odenbrett Automobile Company, of Milwaukee, has established a gas tank recharging station on North Water street and Holton viaduct.

The Model Automobile Company, Peru, Ind., whose two additional buildings will be completed in about six weeks, recently had to resort to the use of tents for finishing cars, so as to be able to deliver on time.

The Waukesha Motor Company, of Waukesha, Wis., has awarded contracts for the new \$12,000 plant on St. Paul avenue, and work has commenced. The building will be 88x135 feet in size, of brick and steel construction.

The sale of the Columbia Electric Company, of Knightstown, Ind., manufacturers of the Leader automobile, is reported. The former owner was Moses Vanderbark, who has disposed of his interests to Earl Frost, of Greenfield, and Alonzo Thomas, of Willow.

Fred Sims, Secretary of State of Indiana, reports that 3,200 automobiles and motorcycles were registered in that State between April 1 and July 9, or considerably more than were registered during all of 1908. Mr. Sims estimates that the average daily sales of automobiles in Indiana by dealers amounted to \$32,000.

The Goodyear Tire and Rubber Company is again supplying each of the contestants in the Glidden Tour with an air bottle free of charge, the same as in former years. The Goodyear air bottles have recently been fitted with a new reducing valve, which can be set to give any desired pressure. It is claimed that no greater pressure than that for which the reducing valve is set can be obtained from the bottle, no matter how far the valve is opened or how long it is left open.

## Club Notes.

An automobile club is at present being organized in Tacoma, Wash. An organizing meeting was held at the Commercial Club on July 6.

The Board of Governors of the Lowell (Mass.) A. C. held a meeting on July 7, and appointed the committees for the carmival to be held at Lowell next fall.

Benjamin H. Marshall and Charles E. Fox, architects, have filed a bill in the Circuit Court at Chicago, to enforce a mechanics' lien claim against the Chicago A. C. Auxiliary Association for \$5,066.32, due for drawing plans, etc. for the chabbouse.

#### Terms of Cadillac Purchase.

While the sale of the Cadillac Motor Car Company stock to the General Motors Company for \$4,500,000 is said to have been on a cash basis, not all of the money was paid over at once. About 25 per cent. was paid down, and the General Motors Company has the option of paying the remainder in instalments in 30, 60 and 90 days, or sooner if it elects. The representatives of the General Motors Company say that the full sum will be paid in 30 days. In the meantime the stock is held in escrow by the Old Detroit National Bank, which will receive the payments and turn over the stock to the General Motors as paid for.

During the past week rumor had it that the General Motors Company were trying to get control of the Maxwell-Briscoe Motor Company, the Packard Motor Car Company, and the E. R. Thomas Motor Company. As usual, none of these rumors could be confirmed.

## Motorcyclists' Convention.

The national meet of the Federation of American Motorcyclists will be held in Indianapolis during the second week in August. It will be preceded by a two days' endurance run from Cleveland to Indianapolis. Originally it was intended to have the run over the route from Indianapolis to French Lick and return, but later the route to Cleveland-Indianapolis was decided upon. The endurance contest will be followed by the convention and three days' race meet on the new speedway at Indianapolis.

# Lowell, Mass., Auto Carnival.

The Lowell Automobile Club plans to hold a five day automobile carnival, beginning Labor Day, September 6, to consist of automobile, motorcycle and motor boat races. The races for small cars to be held on Labor Day will be for the Vesper Club trophy, the Yorick Club trophy, and the Merrimac Valley trophy. On the following Wednesday a cash prize of \$1,000 and the Lowell trophy will be competed for by cars having a piston displacement of 451 to 600 cubic inches, and a minimum weight of 2,400 pounds. The motorcycle races will be open to six classes, and will include a 100 mile race for the American championship, and 10 and 50 mile races for professional drivers.

# To Supply Parts for Wayne and Northern Cars.

L. A. Austin and A. O. Dunk, Detroit, Mich., have organized the Auto Parts Company, and have purchased from the Everitt-Metzger-Flanders Company the drawings and tools of the Wayne Automobile Company and the Northern Motor Car Company, whose models were discontinued when the Everitt-Metzger-Flanders Company was anized. The company will operate a ma-

chine shop at St. Antoine street and the Michigan Central Railway crossing and will supply spare parts for Wayne and Northern cars.

# Gary Locates at Muskegon.

The Gary Motor Car Company, recently incorporated by Alfred C. Gary, a nephew of the steel trust head, has decided to locate in Muskegon, Mich., the business men's club of that city furnishing a site and a factory building. Work is to be commenced at once on a one story brick building 400 feet long, which it is expected to have ready for occupancy by October 1.

## Tincher Bankrupt,

Thomas L. Tincher, of Chicago, Ill., one of the principal stockholders of the Tincher Motor Car Company, of South Bend, Ind., has filed a voluntary petition in bankruptcy, with liabilities amounting to \$48,359.57, and assets, aside from his stock in the automobile company, amounting to \$4,656.23.

# Garage Notes.

F. J. Cosford has opened a garage in Duluth, Minn., on Superior street.

The Missabe Auto and Machine Co. has been organized at Hibbing, Minn., with F. M. Smith as manager.

Joseph Coombs, of Marysville, Cal., has bought the garage of Capt. J. Rupert Foster on Second street, that city.

The Carondelet Auto and Machine Co., Carondelet, Mo., is erecting a one story brick factory building at 116 Robert avenue, at a cost of \$2,950.

J. D. Strutzel, Joliet, Ill., has taken the agency for the Mitchell line, and will shortly open a garage at 104 Jefferson street, which was formerly occupied by the Kinnel Auto Co.

The Girard Auto Co., Houston, Tex., is planning to erect a new garage, 66x125 feet, on Young street, just off Ervay, at a cost of approximately \$12,000. The building is to be of concrete and one story high.

P. J. Lee, W. T. McKallip and Elmer Abbey, Houston, Tex., have formed a partnership under the firm name of Lee, McKallip & Abbey, and have opened a sales agency for Jackson gasoline and Babcock electric cars.

W. R. Demster, Kansas City, Mo., will shortly open a garage at 1316 Oak street. It is a one story structure specially erected for the purpose, and is exceedingly well lighted. Mr. Demster is looking for a line of cars to handle.

The new concrete block garage of M. F. Case, Cando, N. Dak., has been completed. The structure is 110 feet long by 50 feet wide, and has a cement floor and Ruberoid roof covering. The garage is divided into three sections, the office in front, garage proper in the middle and repair shop in the rear

Sutter & Gamble, of Burlington, Ia., have moved into their new building at 113-115 North Main street. It is a three story and basement structure with a frontage of 40 feet and a depth of 117 feet. The first floor is divided into two departments, one serving as an automobile showroom and the other as a sporting goods selestroom. The second floor contains the automobile repair shop and the third serves for storage. An electric elevator connects the different floors. It is stated that the building will easily accommodate 150 automobiles.

## Trade Personals.

C. H. Hill, formerly with the Cadillac Co., of New York, has severed his connections with that firm, and is now with the Haynes Automobile Co. A. S. Jones, formerly connected with the Philadelphia Ford agency, has been appointed sales manager of the Maxwell branch in Philadelphia.

Henry H. Hower, former auto editor of the Cleveland Plain Dealer, has accepted the position of sales manager for the F. B. Stearns Co., Cleveland, Ohio.

John C. Zimmerman, who was formerly connected with the Fisk Rubber Company for several years, has been appointed Chicago city salesman for the Michelin Tire Co.

James Couzens, secretary and treasurer of the Ford Motor Co., Detroit, Mich., will leave for Europe toward the end of this month to look after the company's foreign business.

H. G. Hamilton, president of the Rapid Motor Vehicle Company, of Pontiac, Mich., has purchased an interest in the Cartercar Co., and has been elected treasurer of the company.

C. E. Davis, superintendent of the American Locomotive Co.'s automobile plant at Providence, R. I., has resigned his position to become superintendent of the Warner Gear Co., Muncie, Ind.

Charles Van Horn, formerly sales manager of the Jackson Automobile Co., Jackson, Mich., has resigned to accept the sales managership of the Selden Motor Vehicle Co., Rochester, N. Y.

Ernest L. Smith, who formerly represented the Standard Roller Bearing Co., of Philadelphia, in the West, has recently been appointed sales manager of the Grant-Lees Machine Co., Cleveland, Ohio.

W. L. Walls has resigned as manager of the St. Louis Maxwell-Briscoe branch, and has been succeeded by F. R. Tate, who had charge of the Goodrich tire agency in St. Louis during the past seven years.

E. Le Roy Pelletier, advertising manager of the Everitt-Metzger-Flanders Co., has been appointed general advertising manager of the Studebaker Motor Car combination, and last week visited South Bend in connection with his new duties.

# New Incorporations.

Chicago Taxicab Co., Chicago, Ill.—Capital stock decreased from \$2,000,000 to \$500,000.

Gary Motor Car Co., Muskegon, Mich.—Incorporators, Alfred C. Gary, William L. Simonton and James L. Maloney, all of Chicago.

Hart Motor Car Co., Chicago, Ill.—Capital stock, \$10,000. Incorporators, Frederick P. Hart, L. A. Shaeburne and H. F. Spangler.

Uhler Motor Co. of St. Joseph, Jefferson City, Mo.—Capital, \$100,000. Incorporators, F. B. Uhler, H. R. Lewis, R. A. Graham and others.

Nicollet Avenue Automobile Co., Minneapolis, Minn.—Capital. \$10,000. Incorporators, F. A. Fitch, O. S. Fitch, H. W. DeParcq and Theodore Wetmore.

Corbitt Taxicab Company, Nashville, Tenn.— Capital stock, \$180,000. Incorporators, H. R. Boyd, J. J. Freeman, Ben Peeples, W. H. Kyle and S. R. Corbitt.

Auto Safety Specialty Co., Buffalo, N. Y.—Capital stock, \$100,000. Incorporators, M. M. Richardson, J. S. Tucker, Childs B. Fish, L. M. Sider and H. Alsworth.

The American Automobile Co., St. Joseph, Mo.—Capital stock, \$25,000. Incorporators, W. G. Campbell, J. Lustenberger, John F. Garber, W. P. Tracy and E. S. Ashbrook.

The Ohio Motor Line Company, West Mansfield, Ohio. Capital, \$10,000. Incorporators, W. W. St venson, A. J. Alexander, J. McGee, W. A. Bell and E. C. Daily.

Mct or Motor Car Co., Indianapolis, Ind.—Capital stock, \$10,000. Incorporators, Leonard Carter, Chas. P. Henderson, Arthur B. Lathrop and Randsom P. Henderson.

The Imperial Automobile Co., Jackson, Mich.—Capital stock, \$100,000. Incorporators, Bradley M. Delamater, Herbert S. Reynolds, Theo, A. Campbell, Franklin Tiffany, E. W. Barber, W. R. Smith, Winthrop Withington, Warren S. Kessler, Thos. E. Barkworth and Jay Clark.

# The Horseless Age

First Automobile Journal in the English Language

**VOLUME XXIV** 

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NUMBER 4

# Decreasing Cost Due to Increasing Market.

By F. E. WATTS.

We often hear surprise expressed at the wonderful values offered in some of the recent low priced automobiles, and the question is frequently asked how they can be sold at a profit. This question is generally answered by saying that the reduction in the cost of machine work accounts for the drop in price, and this statement is often made as if it accounted for the entire reduction.

Since many of those who are now engaged in the buying and selling of automobiles have never had occasion to look into the factors which go to make up the cost of a manufactured article it has occurred to the writer that some of them may perhaps be interested in the subject. Hence this article, which is a rough statement of some of the principal factors of the cost of production, which enables us to understand, in a general way, how the reduction in selling price has been brought about, and what further reductions may be looked forward to in view of the forces at present acting on the automobile industry.

The following diagram shows the different factors which go to make up the selling price of an automobile. It is a slight modification of a diagram in a recent book entitled "The Cost of Production."

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I. Factory cost.

Selling expense.

and possibly drayage at either or both ends of the route. Storage cost includes the work of handling, when storing and giving out, and of keeping track of parts in stock and when given out. Use includes the waste incident to machining raw material or the waste in assembling certain parts. The net price for scrap may be deducted from this waste.

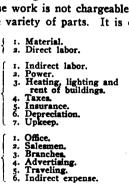
Various methods are used to properly ap-

terial is produced plus the cost for freight.

Various methods are used to properly apportion these charges among the different classes of materials, but many of them are rather rough guesses at the actual facts.

DIRECT LABOR.—Labor is usually classed as direct when it can be entered on the workman's time card so as to be charged against some particular article or class of articles. It is usually taken as including the mechanics who make, assemble, test or finish the different parts. In addition to these a part of the work of the drafting and clerical force is often counted as direct

INDIRECT LABOR.—This is usually considered as including the work of foremen and of part of the office, designing and drafting forces, and in general the work of all people whose work is not chargeable to a considerable variety of parts. It is difficult to



Taking up the final items in order we will first consider the material. This may be roughly divided into two classes, viz., raw material and finished material. Examples of the first would be bar steel, tubing, aluminum castings or any of the hundred and one parts on which work is done at the factory. In the second class would come such parts as frames, axles, steering gears or ignition apparatus, when these are bought complete from outside parties all ready to put on the car.

The total cost of any of these materials is the sum of the purchase price, storage and use. The purchase price may be taken as the cost of the factory where the ma-

distribute indirect labor so that each piece shall bear its proper burden.

Power, Heating and Lighting require no explanation.

RENT OF BUILDINGS.—Rent is usually charged to the factory cost if the buildings are hired. But if the buildings are owned a suitable amount for rent and some of the other items may be charged under the head of profit.

Insurance on buildings, equipment, or parts in the process of manufacture is charged under burden. But insurance on finished machines is properly a part of the selling expense.

Depreciation.—This may be due to a va-

riety of causes. There is always the decrease in the value of a factory, and of tools and other appliances due to age and wear. Improvements in buildings, in methods of doing work, and the advent of new inventions often make this depreciation very rapid, especially in a new business. Increase in the value of the site occupied by the factory, or in the cost of labor and building material, may offset a part of this depreciation.

UPKEEP.—Upkeep, like depreciation, is largest in a new industry, for if the factory is kept up as it should be many new devices must be constantly added.

#### SELLING EXPENSE.

Office.—A part of the office force is directly concerned with the sale of cars, and hence forms part of the selling expense.

SALESMEN.—All manufacturers have salesmen who look after sales in a certain territory, keeping in touch with and appointing sub-agents, and sometimes making sales direct where there are no local agents.

SELLING BRANCHES.—Some of the larger manufacturers have branches in the large cities from which the selling for a specified district is carried on. The cost of running these branches is directly chargeable to the selling expense when they form an integral part of the factory organization. When they are separate in everything but name they are really branch agents, and are not included in the selling price.

ADVERTISING.—Advertising is usually considered as chargeable to the selling expense. But another and fairer way to look at it is as partly chargeable to present selling expense and partly an investment, since it creates a reputation for and a public favor toward the product the company is selling from year to year.

Traveling.—Traveling expenses for salesmen and others are often kept separate from other expenses, and the proper portion is applied to the selling expense.

Indirect Expense.—Indirect selling expense may include part of the salaries paid to higher officials, the remainder being considered as coming under indirect labor. It also includes free repairs and many small miscellaneous expenses.

Profit.—Profit must take care of interest and discount and of rent if the buildings are owned. The tangible expression of profit as dividends varies largely with the policy of the management. In any given factory it may be large or small, depending upon whether a proper allowance is made for repairs, depreciation, sinking fund, etc.

Cost keeping is by no means an exact science, and it may be seen by a glance at

the foregoing that while it is comparatively easy to arrive at conclusions as to the total cost of a completed machine, it is a far more difficult matter to determine the cost of each of its parts with a fair degree of accuracy. The more complicated the costs system and the more it goes into detail the closer should the costs obtained correspond to the actual facts. As a large company can afford a more complete system of records than a small one, it can get more accurate costs, and this is one of the advantages of size, for the more accurately the cost of a machine is known the smaller can the margin of profit be safely made in case it is necessary to cut prices to meet competition.

SOME FEATURES OF THE LOW PRICED CARS.

If we glance over the various details of construction of the four cylinder automobiles selling at \$1,500 and under we note that there are no very marked differences between them and many of the machines which sell at much higher prices. The cylinders are often cast together so that all four hores may be finished at the same time. Some of the crank shafts have only two bearings, but this adds to the weight of the forging and to the size of the journals and bushings, so that the only important saving is probably in assembling. Change gears are usually mounted either with the motor or the rear axle, and are very compactly placed. Here, again, we have a slight saving in weight and in the machine work, with a still larger saving in the final assembling. Operating mechanisms have been simplified. which means another saving in the number of small parts which must be adjusted when putting the cars together. The "block" motor itself is cheap to place in the car, for there are very few connections to make. since water pipes, manifolds, etc., are often cast integral with the cylinders.

ADVANTAGES OF MAKING LARGE QUANTITIES.

But the great saving in machining these parts comes not so much from particular points of design as from the fact that they are manufactured in large quantities. Owing to this fact special fixtures of jigs can be made for every operation, and even special machine tools designed for many of the important parts. Although these jigs and tools may be expensive, their cost is divided by several thousand when applied to each piece. So the tool cost for each piece usually amounts to only a few cents, which is a small amount when compared with the saving in the machinist's time.

But this direct saving per piece is only a small part of the total saving. Where the pieces are made fast the same number of foremen and higher officials can superintend their manufacture that are required where a much smaller number of parts are made slowly. This gives a much smaller expense for superintendence per piece. The same is true for all the other classes of indirect labor, to a greater or less extent.

The saving in that class of factory burden chargeable to the buildings and equipment is no less marked. For the faster the parts

are put through the shop the less floor space is required for each part produced in a season.

At the recent tariff hearing Mr. Durant stated that the cost for direct labor on a car selling at from \$1.250 to \$1.500 was about 14 per cent. This would give from \$175 to \$210 per car for direct labor. But while this seems almost incredibly low, we have shown above that each dollar saved in direct labor may mean several dollars' saving in the factory cost. So machine shop savings, which seem relatively small, decrease the selling price or increase the profit perceptibly.

This saving also applies to the assemling and painting. If a car goes through the paint shop in a week it is chargeable with only a quarter as much burden for the space it occupies as it would be if it took a month to paint it. And it must be remembered that the space and time occupied in assembling and painting automobiles adds very largely to their cost, for the process is necessarily somewhat slow, and the space each automobile occupies is relatively large.

The quality of material entering into the construction of an automobile plays a considerable figure in the final cost. Steels vary in price from about 31/2 cents to \$1 a pound for some of the special grades. The grades used in various makes of cars may be said to run from the lower figure to about 25 cents a pound. The carbon and vanadium steels used in the cheaper cars run from 31/2 to about 7 cents. As a general rule, the cheaper steels machine faster than the more expensive ones, and since nearly as much of the expensive steels must be used as of the cheaper ones, owing to the necessity for rigidity, the saving in this item is quite marked. In the case of castings the sul stitution of grey and malleable iron for aluminum often means a distinct saving in the material cost, at the expense of a slight increase in weight.

In many cases these savings in the initial cost of material result in slight savings in the cost of handling and storage. But there is not generally the multiplied saving which results from a reduction in the hours required for machining.

In some cases, however, where pressed steel parts may be substituted for cast or forged ones, there may be a saving all along the line of manufacture, so the finished piece may be much cheaper indeed.

# LOW PRICES OF PARIS.

The ruling prices of that class of material which is bought by the automobile manufacturer ready made are very much lower than those of a year or so ago. The recent business depression was largely responsible for this sudden drop. At that time there were many parts makers bidding for each job in sight, and naturally the competition brought the bids very low. Indeed they were so low that the parts makers were obliged to adopt every expedient to prevent losing money on their contracts. As some of them said at the time: "You never know

what you can do till you have to," so many of them made a fair profit. But others were unfortunate enough to sustain a loss, so the prices are a shade higher this year. Indications are that they have even increased a trifle in the past two months; nevertheless at the present time frames, crank shafts, axles, change gears, motors, magnetos, etc., can be bought at prices which seem surprisingly low when one remembers the quotations of a couple of years ago.

#### PRO RATA SELLING COST.

The seiling expense where there are a large number of cars to sell is reduced in much the same way that the factory cost is reduced by quantity manufacture. For, while it may take a somewhat larger and more expensive organization and more advertising space to sell 10,000 cars than 500, the expense per car will not be nearly so large when it is distributed over the season's output.

And right here I believe it will not be out of place to mention a popular fallacy. It is common to point to the large salaries paid to some of the higher officials of the larger companies with a kind of mild horror, the idea being that they are a drain on the profits of the company. No doubt that is true in some cases, but the manager who can bring the various parts of a large business into harmonious relationship, who can keep 3,000 or 4,000 men profitably employed, or the man who can sell what they produce expeditiously and cheaply, usually earns all that he gets "and then some."

It has just been noticed how each dollar saved in the shop results in a multiplied saving in the selling price. In this connection let us not forget another phase of the question, namely, cost of the high priced car. The low priced machine is now for the first time made practical by the opening of a large market and the standardization of design. The more expensive car is limited in its field to those who can afford to pay the price for those niceties of material and finish which mean the height of comfort and durability. A car at \$3,000 and one for \$5.000 may look nearly alike, and may run nearly alike, and yet each may be equally good value. For each may represent the cost to produce, by advanced methods, plus substantially the same margin of profit. Each dollar spent for extra work in adjusting or finishing adds considerably to the selling price, and those who wish the refinements of construction should be willing to pay for them

# FUTURE PROGRESS.

In any new branch of manufacture the margin allowed for profit must be high, for changes of design, inventions and variations in the market cannot be as readily foretold as in older industries. New equipment is frequently required; expensive jigs and tools must be thrown away, and new selling methods adopted to interest new classes of buyers. For this reason capital has always demanded a large margin of

profit when entering the manufacture of automobiles.

While this margin has been somewhat reduced by the large demand for the moderate priced machines, it is doubtful if this demand will continue long enough, so that the present factor of profit can be greatly reduced. For it must be kept large enough to safeguard the money invested.

Material prices are not likely to be much reduced, particularly those for manufactured parts. Motor car designs can, however, be still further simplified, with consequent reduction in factory cost.

Just how much the manufacture of motor cars could be cheapened if, say, 50 per cent. of it were controlled by one organization, is an open question. Undoubtedly material could be bought to somewhat better advantage. There would very likely be a slight saving in direct labor. Both selling expense and profit could be slightly reduced, the latter since the market could be controlled in a measure. In the diagram the selling price may mean either of two things. When the car is sold direct through a factory agent or by a factory branch, which is an integral part of the organization, it shows the price to the user. When it is sold through a local agent or separate branch it shows the price to the agent which, with the usual agent's commission of about 20 per cent., is about 80 per cent. of what the user pays. It is possible that a powerful combination might be able to reduce this commission, though whether it is too large or too small is at present a mooted point

Just how great the advantages of combination would be is, as I have said before, a question. "An institution is the lengthened shadow of a man," and when the shadow gets so long that the man cannot see its details clearly there is nothing gained from increasing its size. When the leader turns his attention from manufacturing to combining, inefficiency is likely to begin in the smaller details of the business.

The writer does not believe that under present conditions the efficiency of manufacturing systems can be maintained with further increase in size. The shop which makes 10,000 automobiles a year can probably sell its product practically as cheap as the shop which makes 50,000 in the same time. Theoretically, of course, it can't, but practically I think it can. Let us wait and see.

# Advance in Prices of Crude Rubber.

Consul George H. Pickerell, of Para, furnished statistics showing that in the month of May the export of crude rubber from that port aggregated 2,704,479 kilos, of which 1,168,503 kilos were shipped to the United States. The consul further reports that the prices of crude rubber have increased at a very lively rate. These increased prices are causing each producer to forward to the market every pound of crude he can, and it is believed the effect will be felt upon the coming crop.

# Some Observations on Taxicabs in New York City.

By Joseph A. Anglada.

Considering the abuse to which the average taxicab is subjected, it is surprising that there are not more disabled cabs seen on the streets of the city. That this is the case is not due to the manufacturers, but generally to the intelligent supervision and care taken of the cabs by the operating companies, who, as a rule, have learned that it is cheaper to keep their cabs in a good state of repair than to put off those little repairs which, when neglected, eventually put a car out of commission when it is wanted most.

#### SOURCES OF TROUBLE.

Interviews with men in charge of the repair departments of most of the taxicab garages in the city brought forth the general information that about six months ago the ignition systems gave more trouble than any other part of the car, but that at present the steering mechanism, as a rule, is the weakest part of the cabs, and next to this the gears sets give the most trouble. Some of the cheaper cabs still suffer from rear axle troubles, while on two makes of foreign cabs the motor and the front wheel hubs, respectively, are the most troublesome parts. That there is not more motor trouble is surprising, when it is considered that almost invariably the operator of a cab will race the motor as fast as it will turn when he thinks that it is not operating properly, and this thought seems to occur to some operators quite frequently. The absence of trouble is probably accounted for by the fact that the motors, as a rule, are copiously lubricated and have comparatively short strokes and light reciprocating parts.

Clutches seem to withstand the rigors of the service quite well, because cases of absolute failure are rare, but they require constant attention to prevent them from becoming unduly worn and jerky in engagement. As far as could be learned, there is no preference for either cone or disc clutches, as they both require about the same amount of attention, and in two cases the operating companies stated that the discs of the clutches wore out about every three months, but that this was not objectionable, because the disc clutches in use engaged more progressively than the cone clutches on their other cars and thus strained the transmissions and rear axle shafts less. Breakages of springs are rare occurrences, and tires now give but little trouble, for instead of using 3 inch and 31/2 inch tires, as was formerly the practice with some companies, 4 inch tires are now the rule on front and rear wheels, and in some few cases 41/2 inch tires are used. Quick detachable tires and removable rims are at present finding more favor than the spare wheels to be attached to the rims of deflated tires.

## LUBRICATION.

Most cabs in present use are wasteful of lubricant, because poor provision is made for keeping it where it belongs, with the result that it escapes, generally around the shaft bearings, and into the pan, from whence it drops to the pavement, and causes the unsightly grease spots and rapid deterioration of the asphalt pavement at the cab stands. As a rule no provision is made for lubricating such parts as spring shackles, brake operating mechanisms and the throttle mechanism; or, if provisions are made, they consist of diminutive oil hole covers located in inaccessible places. The provision for introducing lubricant to the universal connections of the propeller shaft, and keeping it there, is also unsatisfactory on most cabs. Transmission cases are in many cases so located that it is impossible to inspect the gears unless the body of the car is removed, and the provision for introducing lubricant to the transmission case and the rear axle housing is not satisfactory to most users, because it is generally necessary to lift the floor boards to get at the gear box, and to get beneath the car to get at the rear axle. It, therefore, seems that if the motor of the cab is fitted with a self contained oiling system. it would be a good idea to connect a copper tube from a screw closed fitting on the outside of the frame to the transmission case, so that oil or grease might be introduced with little trouble, Likewise, if the propeller shaft has but one universal joint, the housing surrounding it should be so arranged that some of the lubricant introduced to it will pass through the tube enclosing the propeller shaft into the rear axle housing. Flexible metal tubes suitable for connecting such parts as the universal joint housing and the clutch shifting collar are at present available, and the writer, therefore, suggests that these parts should be connected by oil tubes to the frame the same as suggested above for the transmission case. The rear axle housing may be lubricated by the same method, or if the propeller shaft has two universal joints the tube may be secured to the torque rod, and a loop of the tube arranged in line with the point where the torque rod is attached to the frame, so that the tube will flex with the movement of the axle. It will, of course, be possible to connect these oil leads to a regular force feed lubricator, also feeding to and driven by the motor, but this is hardly advisable because of the initial cost of the lubricator and the subsequent cost of the oil, a good grade of machine oil being just as satisfactory for transmission parts as gas engine oil, and less costly. The arrangement of the tubes on the frame can be worked out in numerous ways, but the writer suggests that each tube should be connected separately so that when the lubricant is introduced by means of an oil or grease gun it will be sure to go where intended, instead of all going to one or two of the places where the connections are the shortest.

Some of the operating companies have

added or put improved means for introducing lubricant to the front hubs on their cars, because where a number of cars must be cared for diminutive oil holes or the necessity for removing hub caps for the purpose of lubricating the wheel bearings is out of the question by reason of the time required.

# DETAILS OF EQUIPMENT.

In the majority of cases magneto ignition is employed, and almost invariably in these cases the time of the spark is fixed. Taximeters, as a rule, are driven from the front wheels, and in cases where they are driven from the rear wheels the drive will be changed to the front wheels in accordance with the law. On most taxicabs in New York city the operator's seat is located on the right, and the cabs of recent date have a space adjacent to this seat for carrying bulky baggage. The cabs with the operator's seat on the left form a small percentage of the total number, and judging from the operator's viewpoint the left hand arrangement possesses no advantage; but where the change speed and control levers can be arranged on the gear case, as is done on one make of cab coming into prominent use, there is an advantage from the manufacturers' viewpoint, because it simplifies the connections to the gear shaft parts and the hand brake rigging.

The brakes on most American taxicabs are better and easier adjusted than those on foreign machines, and, judging from the opinions of users, are satisfactory as far as holding power is concerned, but unsatisfactory in respect to evenness of braking power and equalization. That is, for an equal pressure on the pedal or lever the effect is not always the same, and usually one wheel is braked more than the other, and principally for this reason it is unsafe to operate most taxicabs on a wet day without tire chains or other anti-skidding devices.

# PROTECTING EXPOSED PARTS.

The location of the tail lamp in daylight, while apparently an unimportant matter, is really important, because two of the large companies have found it expedient to carry the lamp on a bracket at the side of the operator's seat because of the number of lamps which were damaged by passing vehicles and collisions when carried in the customary place at the rear. Likewise, other operators have had heavier bars placed between the front spring hangers to act as a protection for the radiator, and the wisdom of this is shown by the number of cabs seen with this bar bent as the result of a collision, sometimes the fault of the driver, and in other cases caused by truck drivers, who as a class seem to be prejudiced against taxicabs, and have a habit of stopping suddenly when being followed by or when passing a taxicab, in the hope that the cab will collide with their truck.

## COURTEOUS DRIVERS.

As in railway and other systems where a number of men are employed who constantly come in touch with the public, these men are in a large measure responsible for the creation of the feeling of the patrons toward the company. For this reason some of the operating companies enjoy the patronage of that part of the public who are in the habit of using taxicabs regularly, while the other companies receive the patronage of the less discriminating and others to whom the use of a taxicab is still a novelty. In defense of the taxicab operator it must be said that he is subject to complaint and abuse upon the least provocation, and the greater his patience and courtesy, even when unjustly attacked, the greater does he deserve the confidence placed in him by his employers.

The taxicabs of some of the companies present an unnecessarily dirty appearance which does not pass unnoticed by patrons, and certainly does not serve to increase the popularity of the cabs.

#### SUPERVISION OVER DRIVERS.

A method whereby the careful operators may be determined by the company is in use by some, and consists of a record of the daily mileage of each cab, the amount of fuel and lubricant furnished and the extent and nature of troubles or damage sustained by the cab, including the tires. This information when compiled in weekly and monthly statements and compared with the earnings and distance traveled by the cab, in addition to the manner in which the driver has conducted himself, as evidenced by the lack of complaints from the company's inspectors or patrons, gives a correct basis for comparison with the records of other drivers of similar cars under the same conditions. The latter comparison is easily made, because generally there are two or more similar cabs operating from the same stand. Drivers, as a rule, do not object to this mild form of surveillance and those who do are not suitable men to employ. Some companies have made the mistake of not giving a driver the same cab each day, if possible. This practice served to make the driver careless. as he knew that he would probably have another cab the following day, and it therefore did not make any difference to him if he abused the car, provided he did not actually break any part of it. In case a driver knows that he will have the same cab each day, provided it is in good running condition, he will be induced to take care of his charge, for if he doesn't the chances are that he will lose his job, or at least be censured; and, besides, if a man drives the same cab each day he soon learns to know its characteristics and therefore will be able to drive it with more credit to himself and his employers.

For next year's Prince Henry Tour a route is being proposed, starting in Munich and leading by way of Tyrol to Italy and back through Hungary to Berlin. The vice president of the Hungarian Automobile Club recently made a scouting tour over part of the proposed route.

# Book Reviews.

Gear Cutting Machinery, by Ralph E. Flanders. Published by John Wiley & Sons, New York. Price \$3.

This is a carefully written and well illustrated work on the subject of which it treats. The author divides gear cutting machines into classes, first according to the form of gear to be cut, next according to the principle of action involved, next according to the method of operation employed, and then according to the kind of mechanism used, and, following out this classification, all the important machines now on the market, both here and in Europe, are described. The first chapter describes the different methods of forming the teeth of gears, and in the second chapter the description of gear cutting machinery is begun, starting with machines for cutting spur gears. The book contains more than 200 illustrations, of which more than one-half are of complete gear cutting machines and the rest line cuts, mainly of parts.

The Motor Car—A Practical Manual for the Use of Students and Motor Car Owners, by Robert W. A. Brewer. Published by D. Van Nostrand & Co., 23 Murray street, New York. Price \$2.

The author states in his preface that the information contained in the book was first embodied in a series of lectures which he delivered at the Crystal Palace School of Practical Engineering, the Royal United Service Institution, and the Royal Automobile Club. The first eighty-four pages of the work relate to the history and principles of operation of the gas engine, and we are inclined to think that the reader who is looking for information on the motor car will be rather disappointed by this part of the book. The author's excuse for including all this extraneous matter is that the action of the larger and cruder gas engine is easier to grasp than that of gasoline engines. The treatment of the parts of the motor car in the succeeding chapters is of a rather elementary character. The functions of the different elements are discussed and points that must be kept in view in their design are enumerated. most elaborate treatment is given the subject of carburetors and fuels, in which field the author has made experiments.

## How to Remove Carbon.

F. R. Fageol, Rambler representative at Oakland, Cal., recommends the following method of cleaning cylinder walls of carbon: Procure a common housekeeper's metallic wash rag, made of a series of wire rings interlocking with one another. The kind preferred is that in which the rings are composed of two coils of wire, one coil overlapping the joint. Another kind, not so good, is that which has no wire overlapping the joint, and can, with little effort, be pulled apart. One of these metallic articles dropped into a cylinder and the other three cylinders made to run about ten minutes completely removes the carbon,

# THE HORSELESS AGE

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# Annual Changes in Models.

Of late the practice of designating succeeding models by the year for which they are brought out has come in for considerable criticism. Some makers state that they do not wait till the end of the season to apply an improvement to their cars, but introduce it in their product as soon as it occurs to them. These manufacturers generally refer to their latest lot of cars as "the new series," but this designation, while it may be quite as convenient from the salesman's standpoint, becomes meaningless at a later date. Let us assume that an owner wishes to dispose of his machine after several years' use. The prospective purchaser naturally wants to know its age. To give this correctly is a relatively simple matter for the original owner, but after a car has changed hands several times there is considerable chance of the age of the machine becoming obscured in the mind of the owner and misrepresented to the prospective purchaser. The designation of models by the year would tend to obviate this, and therefore has at least one ad-

Those who argue against the use of the

terms "1000 model," "1010 model," etc., assume, of course, that this practice has some detrimental effect on the industry. It is believed by many that it is responsible for the fluctuations in the demand for automobiles with the seasons, which is one of the greatest handicaps under which the automobile industry labors. That there is some foundation for this argument cannot be denied. A purchaser familiar with the practice of the industry, of bringing out new models with more or less important changes in the fall of the year, is not very likely to buy a car during the summer months, as it would be superseded in a very short time, and would then materially depreciate in selling value. This year, fortunately, we are not likely to have any prolonged dead season, for the reason that many manufacturers have been behind in deliveries, and as they had their new models completed early they could begin work on these as soon as the old cars were off their hands.

But whatever influence the practice of changing models annually may have had on prolonging the dead season, it is bound to decrease as time goes on. The changes in design between successive models are becoming less important every year. Moreover, the public is becoming aware that automobile design is becoming settled, and that a car is by no means obsolete as soon as its manufacturer announces a new model. As long as the automobile is chiefly a pleasure vehicle, sales are bound to fluctuate with the seasons. Also changes must be introduced at some time, and it is certainly not desirable to change models oftener than once a year. One other factor which favors the annual changes is the custom of making annual contracts with dealers. In the fall of the year new agents are always appointed, who are required to contract for a certain number of cars for delivery during the coming season. The dealer, before he signs such a contract, wants to know what kind of car he is to receive, and the manufacturer, therefore, must have his plans for the year complete before he can appoint agents.

The public expectation of new models annually is perhaps particularly irritating to manufacturers whose cars are so satisfactory that there is no obvious chance for improvement. The manufacturer who offers practically the same model year after year runs the risk of being regarded as unprogressive, but upon closer investigation it will generally be found that his car gives

all round satisfaction, whereas if a car is almost wholly redesigned at the end of a year the chances are that it was not very successful.

# Brake Location.

Recent practice favors the placing of both sets of brakes on the rear axle where they act directly on the wheel drums. The reason given for this practice by most manufacturers is that it is desirable to apply the braking force as near the point where the momentum of the car is checked as possible, and since the friction of the tire on the road is used for stopping the vehicle an ideal brake would be one applied at the wheel rim, if it were not for other conditions of operation.

In a sense this argument is true, especially for the heavier braking, for the fewer elements there are between the tire and the brake the fewer there are subjected to heavy stresses and the fewer chances of failure. For there is probably less danger of failure among the connecting rods between the operating lever and the brake than in the parts of the brake itself, since the rods are only stressed by the pull of the operator and the brake parts work against the momentum of the vehicle.

But while this applies to the emergency brakes, which, as their name applies, are often put on suddenly, we are not so certain that it is true of the service brake. This latter brake, being pedal applied, and used in the ordinary operation of the car, can be used much more readily, and hence need not be put on so hard at first as the hand brake. If it is placed on the driving shaft it is well out of the way of the mud and dust, connections are short, and can easily be kept tight, and owing to the fact that the brake is geared up from the wheels a small light brake will do more work than it would on the wheels and can be more easily operated.

The braking effort passes through the differential which equalizes the effect at the rear wheels, and this condition is believed to be desirable for service braking. Finally, though the braking stresses must be transmitted through the propeller shaft, driving gears, differential gears, axle shafts and their fastenings, these stresses, with proper brake design, are no greater than those imposed by the clutch. And if the parts are properly designed with an appropriate factor of safety there is little danger of their breaking. The transmission of braking effort through these parts will no doubt

increase the wear on them, but it was long ago proven that if they are made as they should be they wear a very long time, even with the brake on the propeller shaft.

It seems probable, then, that the service brake will be found perfectly satisfactory in either position, so far as the durability of the mechanism is concerned. And the feature which should decide its location is probably convenience of operation. It is likely that the more perfect equalizing obtained from the transmission brake makes it somewhat the better, particularly for cars of moderate power, where the driving gears and other transmission mechanism may be made amply strong without undue weight.

## Pressed Steel Bodies.

Parts must be standardized so that they can be manufactured in large quantities before they can be made from pressed steel. This is particularly true of large parts, which require large presses for their production and large (and therefore expensive) dies. While pressed steel has been used in bodies for some time past, principally for doors and seat backs, the coming season promises to show considerable development in this direction.

Indeed, we are promised complete bodies of pressed steel. By "complete" we mean to include every part—seats, underbody, foot boards, heel boards, and even the framework to which the upholstery is fastened.

Not only may these bodies be cheaply produced, but they can also be given a very durable finish. By using proper vats they can be dipped in enamel, and though some brush work will doubtless be required, this will be reduced to the minimum. The enamel can then be baked, giving a finish which will probably stand more abuse than the most careful job of painting.

With the appearance of the pressed steel body it will be possible to design a car which is practically all metal, except the upholstery and the ignition wire, for running boards, wheels, dashes and steering wheel rims have all been made from steel. It is of course, an open question whether any other material equals wood for some parts of an automobile, but we can at least view the rising price of lumber with more equanimity if we have a substitute available

Very likely at present prices wood bodies are cheaper than those made from pressed steel, when we compare the unpainted bodies. But it is probable that the enameling can be done so much quicker than a good job of painting that the finished steel body will compare very favorably with its wooden rival, even for cars of moderate price.

# The Speedometer as a Safety Appliance.

Among the many factors entering into safe automobile driving the speedometer occupies a foremost position. This instrument, although it has no automatic mechanical control over the running of the vehicle, does as much in the interest of safety as lights and signaling devices, and possibly even as much as chains and other non-skidding equipment.

High speed is the cause of most accidents, as all will agree. Of course, accidents have happened that were not caused by high speed, but they usually did not result in serious injury. The impact resulting from collisions when going at a high speed is frequently the cause of fatalities. A low speed impact cannot do serious harm. How uncomfortable is the sensation when going at a rate of 35 to 45 miles per hour and the thought suddenly comes to mind "Suppose a wheel should come off or a steering knuckle break!"

Such a speed is always dangerous. We need reminding that 40 miles per hour is unsafe, but in nine cases out of ten, if it were not for the speedometer, the automobile driver would not realize the velocity of his car. Then, again, not only does safety put a limit on speed, but the legal limit should not be exceeded. How is one to tell when these limits are being exceeded? A speedometer, when once installed, becomes an object of constant attention, and although the fluctuation of the needle is dependent on the speed of the car, in a certain and correct sense the speed is controlled by it.

That there is a limit to the safe speed of every automobile must be conceded. This limit, of course, is far above the limit laid down by law. Nevertheless, the fact that there is a limit to the safe speed is most important.

At the present stage of the industry the speedometer, taken together with two or three other safety appliances, must be given high rank as a most influential agent conducive to safe driving and compliance with the law.

# State Dealers' Organizations.

We have now three classes of dealers' organizations, viz., national, State and local. The latest class of organization is the State association, and is represented as yet by only a single body, which was formed at Marshalltown, Ia., a fortnight ago. There is little doubt that dealers in other States will follow the example set in Iowa and join for their mutual protection. One vexed question that a State association is in the best position to solve is that of sales by one agent in the territory of another, a subject that has repeatedly been the cause of litigation.

The objects of the local dealers' associations are generally to co-operate in making propaganda for the automobile locally, by means of shows and competitions, and sometimes to protect themselves against oppressive local regulations. On the other hand, when dealers join in a State or national body, they generally wish to protect themselves in their relations with the manufacturers, though the suppression of "shady" practices in the auto trade may also be one of the objects. The Iowa association, it seems, was formed in order to prevent a recurrence of the annoying delays in delivery which characterized the business this year. Just how the association will go about correcting this evil is not evident. The chief cause for these delays was the unexpectedly large demand for cars which led the manufacturers to accept orders larger than they could fill. Presumably the dealers' association will insist upon a penalty for delay in delivery. The question then would be whether the manufacturers could be forced to agree to such a penalty as long as they can sell more cars than they can produce. Once the demand slackens the delivery problem will solve itself.

Coming Events.

July 31—Kansas City (Mo.) Race to Elm Ridge Park, Kansas City A. C.

August 5—Algonquin (Ill.) Fourth Annual Hill Climb on Algonquin and Perry Hills, Chicago M. C.

August 7—Richfield Springs Hill Climb.

August 17—Cheyenne, Wyo., Track Meet, A. C. of Cheyenne.

August 31 or September 30—Milwaukee (Wis) Annual Orphans' Outing, Milwaukee A. C. September 6-11—Lowell (Mass.) Annual Motor

Carnival, Lowell A. C.
September 15—Denver (Col.) Start of Flag-to-Flag Race to Mexico City. Denver M. C.

Flag Race to Mexico City, Denver M. C.
October 7—Philadeiphia (Pa.) Second Annual
200 Mile Stock Chassis Race in Fairmount Park,
Quaker City M. C.

November 6 to 13 National Automobile Show under the auspices of the N. A. A. M. at Atlanta, Ga.

December 20-30-Philadelphia (Pa.) Annual Midwinter Endurance Contest Qualter City M. C.

# The Sixth Annual A. A. A. Reliability Tour-III.

BY CHESTER S. RICKER.

Minneapolis to Mankato.

Mankato, Minn., July 19.—Today's rur. was conceded by all the tourists to have been the most pleasant so far. The roads all the way were perfect. They consisted of an alluvial soil which is the finest kind of surface to drive over when it is dry. The drivers, however, began to realize what is in store for them if they have to drive through this when it is wet. A stiff wind blew almost all the time, and as a result the dust was blown away from behind each car almost as soon as it rose, thus making



it a clean and dustless trip for the majority of the contestants.

No troubles of consequence occurred to the contesting cars. Such, however, was not the case with the non-contestants, for the confetti car, No. 97, broke its steering knuckle and was ditched. None of the occupants of the car were injured in the least, although they were considerably shaken up and frightened. The accident occurred about 60 miles out of Minneapolis. The occupants of the car were A. J. May, driver; C. B. Gray, mechanic, and "Mort" Reeves, chief observer.

The run today, besides being the pleasantest, was also the shortest so far. It took the tourists through a rolling country which was dotted with lakes and groups of trees here and there. Mile after mile the tourists ran through fields of waving wheat and corn. The start was marked by the brief but pleasant reception which St. Paul autoists gave us. The first car, Premier No. 1, left at 7:45 a. m. As the cars passed the big Auditorium in St. Paul they were hailed by an officer and made to drive into the building. Once inside the St. Paul autoists treated the tourists to neatly packed boxes of candy, cigars and St. Paul postcards (which, by the way, were already stamped). Around the box was tied a little pencil in the form of a monk, together with the advice to use him and send the cards home.

THE NOON STOP.

Today's noon stop was a great surprise to the contestants. Since leaving Milwaukee the tourists have had to get their lunches wherever they could, but today the Automobile Club of Owatonna had a feast prepared for us. Pretty girls were in charge of the refreshments, and came out to each car to serve its occupants with milk. coffee, lemonade and buttermilk. A neatly done up package containing a couple of club sandwiches and a doughnut was also given to each person.

The route was not without historic interest, as we passed through the town of Northfield, where the notorious James brothers made their last stand. The cars passed around the corner on which stands the bank in which they were caught. Owatonna, in which we stopped for lunch, is one of the largest butter producing centres of the country. Over 3,000,000 pounds of butter were made there during the last year. Pleasant weather, as usual, accompanied the tourists today, and it is promised for tomorrow.

#### TIRE TROUBLES.

At no time before has there been so much tire trouble, which may seem surprising in view of the above statement that the roads were the best and the run was the shortest. The cars suffering from this inconvenience were as follows: Nos. 3, 7, 100, 101, 108 and 114 each had one puncture, while cars Nos. 4, 14 and 105 each had two punctures. Three of the machines which had tire trouble today had the same air in their tires which was put in at Detroit. Cars with clean tire scores up to date are Nos. 2, 6, 9, 10, 51, 52, 53, 102, 103, 104, 107, 109, 110 and 112.

## BRUSH RUNABOUTS WITHDRAW.

The announcement was made tonight that the Brush runabout entries, Nos. 103 and 104, have been withdrawn. The reason given is that the schedule is too fast for these little 7 horse power runabouts. The majority of the drivers of the other cars have been thinking the same for some time. They agree, however, that it will mean far more if they get through going at the speed for which they were designed, rather than fail only because they were driven at an impracticable rate.

#### TODAY'S PENALTIES.

Only two cars received penalties today, one on account of a recurrence of a trouble which began on the first day out. The other defect was a new development, however, and was probably the first noticeable effect of the terrible punishment which the cars stood on the run from Madison to La Crosse. Car No. 3. Chalmers-Detroit. driven by Bolger, lost another point today on account of tightening up the mud guard, which broke loose on the first day of the run, and has been penalized 2.4 points in all to date. The Jewel car, No. 111, driven by Shimp, had to have the bolts in the rear wheel hub flange tightened. For the driver's time 2.3 points were imposed, together with 3.5 points for the mechanic's time. Total points, 5.8.

The Maxwell press car, No. 82, driven by George Illingsworth, which is accompanying the tourists, bent its steering knuckle this afternoon. The manner in which the accident happened was reported as follows: They had turned out to give way to the Pierce runabout, No. 108, driven by Williams. In the long grass which bordered the road the driver was unable to see a deep hole, into which he plunged, the result being that he came out with a bent knuckle.

## ROUTE CHANGED.

The route was changed because the bridge across the Mississippi which we were to cross was closed. As a result the distance was increased about 3 miles, and more than one unfortunate lost the road. Gus Buse, driving the big Thomas entry, No. 11, lost over forty-five minutes and yet finished well within time.

There was almost no racing, as the chairman held to a steady schedule, and was seldom over twenty minutes ahead of time during the day. The roads were so fine that



RAPID TRUCK CARRYING TIRES AND AIR BOTTLES.



WHERE BUSE'S THIMAS SANK INTO QUICESAND

there would have probably been a great deal thing that we will have the Pullmans there, had he not done so.

Beginning at Fort Dodge, we will have the

# LITTLE MISUNDERSTANDING.

There seems to be very little misunderstanding of the rules this year. In a measure this may be due to the small amount of trouble which has happened so far, "When the shoe pinches one usually hollers," and it takes such an impartial judge as Mr. Hower to handle each of these cases. So far no one has questioned any decision the chairman has made.

## DAI LEWIS' ROUTE BOOK.

From the number of schoolhouses which Dai H. Lewis has recorded in the route book it is evident that the younger Americans in this country will not want for an education if they are disposed to get it. The same is equally true of churches and graveyards, for there is probably not one on the landscape which our jovial pilot has not recorded in the route book.

# THE BUNNING TIME TODAY.

Class A-6 hours 36 minutes.

Class B-6 bours 46 minutes.

Class C-6 hours 56 minutes.

Class E-7 hours 16 minutes.

Total mileage 132, with 3 miles additional caused by the detour in St. Paul.

# ENTERTAINMENT AT MANKATO.

A Dutch lunch was served at the Elks from 8 o'clock until as late as was desired. It was given under the auspices of the Mankato Automobile Club, and was very enjoyable, although all the tourists desired to retire early. John H. Holmann, the president of the club, was the host.

The American Simplex agent here tendered a three hour boat ride on the Minnesota River. Those who could go on the trip enjoyed it very much. The fact that a general meeting was called at 8:30 made it impossible for the greater portion of the tourists to take advantage of the occasion.

## RUMORS.

It is reported that the Ringling Brothers Circus will be at Fort Dodge the same day as we are. For this reason it is a fortunate thing that we will have the Pullmans there. Beginning at Fort Dodge, we will have the sleeping cars all the way to Kansas City. The made just out of Fort Dodge and as far as Moorland are reported as bottomless, and so the route has been changed by the local authorities on the advice of Pilot Dai H. Lewis.

# Mankato to Fort Dodge.

Fort Doore, Iowa, July 20.—To-day's stage was, with one exception, the shortest we have had so far. The going, however, was not as good as it was yesterday, and although only 138.6 miles had to be covered it required considerable physical effort on the part of some of the occupants of the cars.

As far as Elmore, 55.1 miles, the tour led over excellent dirt roads, and the tourists expected the same pleasant time they had the previous day. Some of the drivers were aware of the condition of the remaining 84 miles and "opened up wide," notably the Pierce contingent, cars Nos. 8 and 108 both passing us at Blue Earth, 45 miles from Mankato. The Premier No. 1, in which the writer was a passenger, had started at least 15 minutes ahead of these cars and maintained a 22 mile an hour schedule, from which it may be seen that the Pierce cars were traveling at a very good clip. However, although racing was indulged in, it was "method in madness," and not for the joy which it does not give. The drivers have learned that one never can tell how the roads will be later in the day, and so they always take advantage of the good stretches to gain on the schedule. Every one arrived in Fort Dodge sufficiently early to oil the car before checking in, but fast driving over the good stretches enabled them to save their cars on the had stretches.

After leaving Elmore we ran for 25 miles through a swampy country with little ponds and treacherous logs on each side of a narrow road. So narrow and rough was the road that many cars barely escaped

a mud bath in the dangerous pools. Three of the cars in the tour were ditched as a result of the treacherous nature of the ditches.

No. 82, the Maxwell press car, ran out of gasoline, and when pushed to one side to let pass the Marmon car, No. 5, driven by Howard Marmon, it became mired. Marmon was unable to draw the Maxwell back on to the road again, but after the driver of the Maxwell had filled up with gasoline he was able to get back onto the road again under his own power and with the assistance of the passengers pushing.

Snyder, driving the Mason car, No. 112, was another unfortunate. He also turned out for an approaching car and found himself stalled. The Midland, No. 12, driven by Hayes, lent him aid, and finally drew him onto dry land again. The Rapid truck, No. 75, was also ditched, but was rapidly pulled back onto the road by the Studebaker and Thomas press cars, and was then able to continue.

Saturday last there was a cloudburst in this section of the country, and the roads were washed away fearfully, according to reports. The farmers, however, took the matter promptly in hand and dragged the roads for miles. Most of the contestants appreciated the effort that had been made to put the roads in good condition for them. The temperature to-day was the highest so far on the tour. Mr. Glidden told the writer that the record was 115° in the sun and 94° in the shade. A strong head wind made it quite comfortable, however, all day long

# TWO ACCIDENTS.

Two accidents occurred to the non-contestant contingent today. The first was to



the E-M-F confetti car, which was passed in trouble at Vernon Center, 21.1 miles from Mankato. This was the same car which broke a steering knuckle yesterday. Today it broke the rear axle and lost the wheel on the opposite side from the front one which came off vesterday. No one was injured, and the occupants were picked up by one of the big Studebaker cars. The second accident was of a more serious nature. E. L. Ferguson, secretary of the Touring Board, was hurt quite seriously. While traveling at a fair rate of speed his car struck a pool in the road and was ditched alongside of a barbed wire fence. Mr. Ferguson was pitched violently into the westsu

COGAN

AMESOURI VALLEY

HOMEY CREEK

COUNCIL Bluffs

DOMANA

COUNCIL Bluffs

DOMANA

COUNCIL Bluffs

DOMANA

COUNCIL Bluffs

fence and sustained bad lacerations of the body and hands. His hip was also injured. PENALTIES.

Only three cars incurred penalizations today. Car No. 107, the Maxwell runabout, had 1.6 points entered against it, which were held over from several days ago. Car No. 12, the Midland, driven by Hayes, had further trouble with its fender, and was penalized 0.6 point for repairing same. As far as the writer remembers, trouble with fenders and fender irons has never been the case of penalizations in previous tours, but two fender brackets have already broken on this tour.

Car No. 3, the Chalmers-Detroit, driven by Bolger, incurred the heaviest penalties to-day. Its score was not officially, announced tonight, because it did not arive until 5:40 o'clock. It was said that 170 minutes' work was done on the car, which will probably entail 17 points penalty, and for late arrival 187 points will probably be imposed. The lateness was due to trouble with a loose crank pin bearing. Bolger told the writer that the babbitt which had been put in the bearing was in four separate pieces, as though oil had been spilled into the babbitt when poured.

BULLETIN.

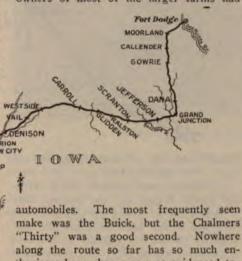
This evening the following "Bulletin" was posted:

"Running time for July 21 will be nine hours forty-eight minutes. The distance is 196 miles. Where confetti does not agree with route book, ignore book and follow confetti. Baggage can be left on the train."

STOPS ON THE ROAD.

During the morning we stopped at Elmore, where buttermilk was served to the tourists as they passed. At Algona, 93.6 miles from the start, we were served beer, and the most delicious ham sandwiches we have had anywhere. The town is "dry," but the boys secured as much beer as they could carry, and after we left there the road was strewn with empty beer bottles for miles.

It was noticed during the day that the owners of most of the larger farms had



make was the Buick, but the Chalmers "Thirty" was a good second. Nowhere along the route so far has so much enthusiasm been shown as was evidenced today. At Fort Dodge, however, Ringling Brothers' Circus completely put us in the shade, there being scarcely anyone to meet us upon our arrival.

The guard at the open air garage where the cars are parked tonight is the most formidable so far. Soldiers in full equipment guard the machines. They carry fixed bayonets and have their tents pitched in the centre of the hollow square formed by the cars.

Ever since we left Madison there have been cases of sickness. Every now and then a car will carry ballast, for a day at least, and sometimes longer, the unfortunate passenger replaced by it going by train

# Fort Dodge to Council Bluffs.

COUNCIL BLUFFS, Ia., July 20.—The run today was the longest so far, and was much

dreaded by the contestants. A cloud burst that occurred about a week ago had washed the roads out in several places, and as a result several detours had to be made. This increased the mileage from 185.5 to 106.

The roads, although they had been reported to be very bad, were really among the best we have had so far. From Paton to Carroll they were almost as smooth as macadam, and since bad roads were anticipated in the second half of the stage the tourists took advantage of the fact and kept up a speed of from 30 to 35 miles per hour. As these good roads continued for over 50 miles, the majority of the cars were soon far ahead of the schedule. Really bad roads were met with at only two or three points, extending only short distances, with the result that almost all the contestants arrived at the night control an hour or more ahead of time. The Pierce cars were the first to finish, and were more than two hours ahead of their schedule.

Several bad mud holes were met with on the road, and one of these was so deep that friendly farmers had put planks over the mud specially for the contestants. Car No. 81, the Studebaker, driven by Harry McIntosh, got into a rut just before reaching the planks. It plunged hub deep into the gumbo, and McIntosh was unable to extricate the car by means of its own power. The railroad, however, parallels the road at this point, running very close to it, and men on a work train nearby hitched a rope on to the car and dragged the Studebaker out of the mud.

Another car mired during the day was the No. 10 Glide, driven by Bartholomew. The car got off the road and sank so deeply into the mud that horses had to be brought to its aid. The unfortunate accident sharply bent the left front steering arm, so that it had to be replaced, and as a result another car lost its perfect score. The Lexington runabout, No. 114, was also mired, but was pulled on to the road again by the Studebaker press car. Car No. 111,



CARS PARKED AT COUNCIL BLUFFS.

the Jewel, driven by Gus Uhl (who was taken Shimp's place), ran into a bank and bent its steering knuckle, and also badly dished its front wheel.

Not since we left Minneapolis have we seen such beautiful country. The last 50 miles led through an exceedingly fertile section. The crops seemed to become heavier and better cared for the nearer we approached to the river. The farm houses and the people in the towns were entirely different from those we saw earlier in the day. If automobiles are an indication of prosperity, all that is necessary to indicate the state of the country is to mention that such cars as the Locomobile. Stoddard-Dayton, Pope-Hartford and Winton were most in evidence along the road, and the Chalmers "Thirty" was also well represented, while in the vicinity of Minneapolis Buicks and Reos were in the lead.

The cause of yesterday's accident to the secretary's Acme car was given as a loose coupling on the tie rod between the front wheels. A new joint had been put in at Detroit. It was said that the pivot bolt was not tightened at that time, and so the rod worked loose, and finally permitted the two steering wheels to become separated.

Complaints of speedometer trouble are beginning to be frequently heard now. Very few of the cars are equipped with more than one instrument, and where only a single one is carried it is extremely aggravating to have it suspend operations. Car No. 1, on which the writer is a passenger, is equipped with two instruments, a Warner and a Stewart, and both are still in perfect working condition. It is next to impossible, however, to keep the gears in mesh continually, and until the day before yesterday we had only one operating most of the time. Dai H. Lewis says that on the prairie it is almost impossible to tell where to turn, unless one has an accurate instrument to go by, in addition to the route book.

More perfect records were broken in today's run than ever before, the following cars losing their perfect scores: Nos. 4. 7, 10, 53, 100 and 102. The only car that did not report on time this evening was the Chalmers, No. 3. It had further trouble with the bearing which began to give

was in the gears. No. 102 lost 30.3 points for replacing a taper pin in the hub of the gear which drives the timer shaft, the pin having sheared off.



trouble yesterday. A new bearing was put in, as has been reported.

The perfect score Marmon, No. 4, driven by Frank Wing, and the perfect score Premier, No. 53, driven by Cliff Waltman, both had trouble with leaky gasoline connections. No. 4 lost 8 points for the time required to fix the leaky connection, while No. 53 only lost 0.8 point for the same

The Jewel touring car, No. 7, driven by Bernhardt, also lost points. Sixteen points were assessed against it for two rear hub flange bolts which were bought, and for the time taken to put same in place.

Another perfect score was spoiled when the Glide car, No, to, had to replace a steering knuckle on the left front wheel. The reason was stated earlier in this report. A penalty of 1.6 points was imposed for time, and the cost penalty was held until later.

Two of the up-to-now perfect score Molines met their "Waterloo" today. No. 100 lost 3.1 points. This was caused by a steel chip getting into the timing gears. On examination the driver, C. H. Vandervoort, found that it was not necessary to remove the chip, but it relieved the minds of those in charge of the car to know nothing worse Car No. 111, the Jewel, now driven by Gus Uhl, lost 8.4 points because it required tightening of the spring clips and tire holders. The rear wheel was removed, so it was reported, to tighten up the hub bolts which were loose. Further penalization accrued from having to straighten a front knuckle, which was bent in the sand bank.

SMALL CARS.

All the little cars, that is the Hupmobile, No. 106, and the two Brushes, Nos. 103 and 104, arrived on time today. They are non-contestants, of course, but they made a good showing.

The White steamer, No. 14, driven by H. N. Searles, has been giving a remarkable demonstration of how a car can be run on kerosene. It has been running unostentatiously, and has no history.

PULLMANS.

Last night the whole party dined on the cars, where they also slept. General satisfaction was expressed at the service, especially the dining car service, and the party acknowledged that no such service had been had since leaving New York or Detroit.

The sleeping cars were not so satisfactory, as it was a draw for the upper or lower berth, and the uppers were not in demand. Another complaint is that there is no place to wash up when the tourists arrive, as they usually beat the train into town.

Up to now the tourists have covered 1,289 miles, and they still have 1,458 to go. The cars having tire trouble the last two days are as follows:

July 19—Cars Nos. 3, 4, 7, 14, 100, 101, 105, 108 and 114.

July 20—Cars Nos. 1, 6, 7, 10 and 14. July 21—Cars Nos. 51 and 105, the least of any day so far.

THE NIGHT'S MEETING.

The meeting was conducted by Dai H. Lewis, and was quite brief. He particularly cautioned the men against throwing matches on the sides of the roads. He also advised observers to take the time of the approach and departure from washouts. And to always get a bill of sale when parts are purchased on the road.

# Council Bluffs to Kearney.

Kearney, Neb., July 22.—So far we have had no rain whatsoever, and the tourists are very grateful to "Jupiter Pluvius." The roads were perfect almost all the way, and very dusty, as there has been no rain for about ten days hereabouts. Nevertheless one mud hole was met which held the big



LEXINGTON, DRIVEN BY JOHN C. MOORE, ON LOUP RIVER BRIDGE.

Thomas No. 11 in its grasp for about forty minutes. Several smaller ones were also encountered, but no one else was mired. The stretch of road which parallels the Union Pacific tracks for the last 20 miles was the longest consecutive stretch of smooth road which we have thus far found. Several cars met the Overland Limited at this point, and one of the press cars is reported to have easily passed it. This shows that the road surface was excellent. Kearney probably has more cars in proportion to population than any other city of its size in the United States, viz.: one car for every forty-five inhabitants, I was told.

This run was the most tiring of any which we have had so far. The distance was 200 miles, and the ride proved exceedingly monotonous owing to the level and unchanging nature of the landscape. Here and there we passed a grove of trees, but except for these there was nothing to break the view to the distant horizon. The heat, which was not unpleasant when the cars were in motion, was unbearable the moment they stopped. So severe was it that even those who had a heavy tan are tonight nursing their blisters. E. L. Ferguson, secretary of the contest board, who was badly cut the other day when he was thrown into a barbed wire fence, has not improved. His hand is frightfully blistered and swollen, and his condition is so serious that it was thought advisable to have him go on ahead to a hospital in Denver.

# ANOTHER CAR OUT.

Another car was dropped today. The Chalmers-Detroit No. 3, which had bearing trouble Tuesday, was withdrawn, and will continue from now on as a non-contestant. The bearing had to be replaced, as was expected after it had been inspected on the day when the trouble first occurred. Much regret is expressed that the only Chalmers in the contest for the Glidden Trophy should be withdrawn.

## PENALIZATIONS.

Only two other cars besides the Chalmers received penalties as a result of the day's run. Two other penalties were changed, however. The only car with a perfect score now competing for the Detroit Trophy is the American Simplex No. 51, driven by W. A. Wood. This is the only two cycle



BRUSH RUNABOUT ENTERING KEARNEY, NEB.

ble, and before it could be repaired 6 points had been charged against him.

The Jewel roadster had to replace a spark plug during the day, and since this is not a part which is carried loose, the square parts bag had to be opened, and a penalty of one point was incurred. The time necessary to put the plug in place added another .4 point, making together 1.4 points, and with former penalties this makes a total penalization of 30.3 points.

The scores changed were on the Glide No. 10 and the Moline No. 102. The former had one point added for the cost of the part replaced. This had not been determined yesterday when the report was given out. The Moline car was penalized 30.3 points yesterday, but on account of some mistake in calculating the work penalty the actual penalty is changed to 16.1 points.

## RUNNING TIME.

The running time was set at exactly ten hours for the Class A cars. The strange part of the schedule was that practically every car exceeded it during the day, and almost in every case without intention. The reason for this was that, except for the first few miles, in the immediate vicinity of Omaha, the roads were as level as a billiard table.

## TIRE TROUBLES.

The long distances, speed and high temperatures are beginning to have their effects on the tires, and tire trouble is inwas of the opinion that he had probably lost his clean score.

#### MECHANICAL TROUBLES.

A number of mechanical troubles that are not officially penalized have become evident. The continuous strain which the cars are subjected to is certainly making itself felt. Several cars have lost their fan belts and long steady plugging across the level country on these fearfully hot days has caused the motor to heat up considerably. These telts cannot be replaced without penalty, and so they are not replaced. One case is known where the valve stems stuck. Some of the valves have evidently begun to warp and it will be interesting to note the way the cars will act after they have run 1.200 miles further. Several steering gears have a large amount of lost motion and in one case the trouble is so pronounced that it seems foolhardy for the driver to continue without doing something to rectify the trouble. Wheels have also suffered. One or two are dished, and one, to my knowledge, has very loose spokes. Most of the contestants are using an excess of oil in their motors, with the result that carbon deposits have formed in the cylinders and preignition is giving some trouble. One car had a very extraordinary break. The steering column tube broke just back of the dashboard, but fortunately no harm was done to the steering column proper.

## THOMAS STUCK IN MUD.

About 95 miles out of Council Bluffs the Thomas No. 11, driven by Gus Buse, was mired. The Rapid truck, which was the first car to arrive, failed to budge the big car. Neither could our car, Premier No. 1, when acting in conjunction with the truck. Even with the additional aid of the Jewel No. 7, the car could not be moved. Finally some one suggested the use of a block and tackle which almost every car on the tour now carries. One block was put on the Rapid truck and the other on the Thomas, then the loose end of the rope was attached to the Premier, and when the latter was started up it soon had the Thomas out.

# EFFECT OF THE HEAT.

Yesterday was so hot that the chairman was nearly prostrated. Several of the



car in the tour, and the consistent performance which it has made so far has been the cause of much favorable comment on the part of other contestants. No. 52, Chalmers, driven by Jean Bemb, also met with a mishap entailing penalization. Bemb's commutator shaft gave some trou-

creasing. Today's run saw the following cars delayed by punctures, etc.: Nos 2, 3, 7, 11, 14, 101, 105, 108 and 114. The White No. 14, driven by H. N. Searles, had no less than five punctures or blowouts and was delayed thereby 180 minutes. Searles got in so late that almost every one

drivers and passengers also felt the heat very badly, and in consequence Mr. Hower, for the first time in any Glidden Tour did not go by road. Instead he remained on the train, and probably had a much pleasanter trip than we unfortunates on the cars. During the day we were passed by the train twice, and Mr. Hower, from his observation car, was able to keep an eye on the run. As today was still hotter it was surprising that no worse experiences were noted.

#### LUNCHES.

In this part of the country it is not always possible to get a good lunch on the road, and so the Pullman dining car served us each morning with a tastily prepared lunch, put up in a card box. Last night the Council Bluffs Auto Club certainly outdid themselves in order to entertain the tourists. They arranged with the Elks to take care of us upon our arrival. As most of these cities are "dry," the B. P. O. E. rooms were put at our disposal. After the cars had all arrived, special trolley cars took the tourists to a lake, where they had a delightful swim. At 8:30 a banquet was served at the Grand Hotel to all who desired to go.

Little baggage is now being carried by the tourists, as almost every one leaves his

C O L

baggage in the Pullmans which go from night stop to night stop. Before this it was very uncomfortable to travel in the contesting cars as they were so heavily loaded that there was little leg room.

# Kearney to Julesburg.

JULESBURG, Col., July 23.—To drive 200 miles in the broiling sun over a prairie, absolutely devoid of anything to break the monotony, is not a particularly pleasurable experience. From remarks overheard in the early part of the tour, it was evident that not a few of the tourists thought the tour would be a "joy ride," but they have since found out that they were sadly mistaken.

This morning dawned clear again, and the roads for the first 100 miles were not very bad, although rough in places. The last 100 miles, from North Platte to Julesburg, was without doubt the most trying stretch so far, excepting the fourth day's route from Madison to La Crosse. The roads for this latter 100 miles' stretch were across the range and were nothing less than two or four ruts in the prairie grass. At frequent intervals these were intersected with culverts, holes, sand or deep gullies. The sand which was met with in several places tried the cars more severely than

hills which have been encountered. of the sand hills proved too much for

five of the cars, and horses were required to extricate the machines. The ranchers probably anticipated trouble, for they congregated in numbers to watch the cars get stuck. The charge made was a dollar for each car.

As a variation from the routes of previous days the population along the road was very scarce, and we repeatedly drove 15 to 20 miles without seeing a single habitation. The railroad was the only sign of civilization in sight. Some of the grades encountered, although short, were very steep. They were miniature cañons, and their sharpness and the crookedness of the road leading through them taxed the drivers' ability in negotiating them. In many cases the bottom was of sand, the kind of sand which is so dry and light that it flows almost like water, and the cars plunged about like so many ships.

The people along the way did not seem interested in the tour to the same extent

as those in the more densely populated districts passed through earlier. The horses on the route were not so familiar with cars as they are further east. Several runaways were reported, but none serious. Some dogs along the line met their fate also. Most of the animals do not appreciate the speed at which an automobile can travel, and find out to their misfortune.

## RUNNING TIME.

A rate of 20 miles an hour was demanded for Class A cars. This means that the 206 miles had to be covered in 10 hours and 19 minutes. Little difficulty was met in maintaining the requisite speed over such long distances. The car in which the writer rode, viz., the Premier, No. 1, stopped for an hour to clean a carburetor, and yet checked in fifteen minutes ahead of the time limit. Several stops had also been made to oil up the car. as is the prevailing custom among contestants.

# PENALTIES.

There was apparently very little mechanical trouble on the road today. The only cars which were penalized were the Glide, No. 10, Moline, No. 102, and Jewel, No. 7. The Glide found it necessary to replace a front spring. The car was penalized 4.2 points for the spring, and 5 points for the time required to make the replacement, making the total penalty 9.2 points. O. P. Bernhardt, driving the Jewel car, No. 7, met with a piece of bad luck that led to his penalization. In the little town of Ogallala, 169 miles out, he ran into a little Ford runabout. The Ford was driven by the owner

for the first time. The latter lost his head, jumped from the car and allowed it to run on. Bernhardt, having the choice of running down a telegraph pole or into the Ford, chose the latter. His mudguard was badly bent, while the Ford was completely disabled. Before starting the mechanic pulled the fender up, and as a result was penalized for a minute's time, or or point.

The Moline, No. 102, lost a loose fender bolt, and for buying a new bolt and replacing it the car was penalized 0.2 point for the cost of the bolt, and 0.8 point for labor, together only 1 point.

Tire troubles were very general today, but of mechanical trouble there was less than on any previous day of the tour. Considering the condition of the roads, and the speed at which the cars are driven, this is remarkable.

SOME MECHANICAL ASPECTS OF THE TOUR.

The cars are undoubtedly overdriven, and the pounding they have to stand in consequence is making itself evident, but the way the cars stand it is marvelous. The opinion of all is that there was not a car built twelve months ago that could have stood the pounding so far. The ruts, which have been a menace to the drivers for the last two days, give the cars a racking which no other roads could possibly do. The cars travel at a speed of anywhere from 25 to 35 miles per hour, and when they slip into the ruts a severe lateral thrust is imposed on the wheels that is unknown on Eastern roads. The ruts vary from two or three inches to a foot in depth. Further, the tracks lead in a course like a snake's path, and it is almost impossible to follow them. The steering gears also receive very severe punishment.

## AT KEARNEY.

The citizens of Kearney who are organized in an auto club gave us a delightful time in so far as they had facilities. On arriving the tourists were given printed breast ribbons, which admitted them to all festivities held there that night In the afternoon they provided baths for us, which was a welcome treat. At the hotel there was plenty to refresh the inner man, and much of a nature which is really not permitted in this "dry" country. In the evening they gave a banquet to the Gliddenites, which was so attractive that many were sorry the next morning that they had stayed up so late the night before, with a 200 mile drive before them. In almost every town or city passed through we have been treated most cordially. In some cases the provisions for our entertainment made really too great demands on our time. The drives this year are longer and harder than ever before, and few of the tourists are able to retire before 10 or 11 o'clock, and all have to turn out before 5 in the morning.

Julesburg to Denver.

Denver, Col., July 24.—Watches are now set one hour back, or on Western time, and as a result everyone was able to get an (Continued on page 107.)

# NEW VEHICLES



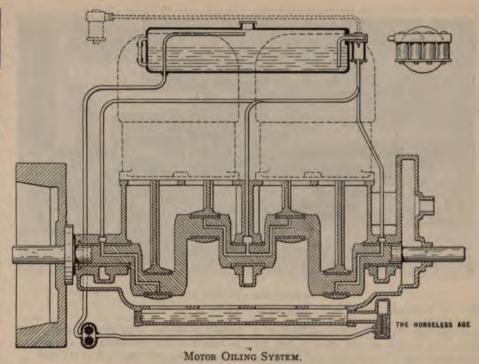
# The Petrel Four Cylinder Cars.

These machines are made by the Petrel Motor Car Company, of Milwaukee. The name Petrel was given them on account of their alleged unusual ability to make good speed over very rough roads. They are especially designed for the class of work required of motor cars in our Western country.

Two models are made, a touring car and a roadster. In general plan they are exactly alike, but their wheel bases and arrangement of parts are somewhat different.

The bore of the motor is 41% inches and its stroke is 41% inches. The cylinders are cast in pairs, with valves all on one side. The crank shaft is of 0.35 per cent. carbon steel and the connecting rods are drop forged. All working parts are carefully ground. All journals, except the piston pins, are bushed with white brass. The pin bearings are of hardened steel, carefully fitted. The crank case is of aluminum, split horizontally.

As shown by the figure, an oil tank is provided in the base of the motor. Oil flows through filtering screens to a gear pump, which forces it to an elevated tank. From the tank it flows by gravity to the main bearings, passing through the holes drilled in the crank shaft to the crank pin



bearings. Ignition is by the Atwater Kent Unisparker. Cooling is by water, with gear pump.

Power is transmitted through a universal coupling to a friction speed changing device and thence by side chains to the rear wheels. The change speed device is known as the "Waite friction drive," It is the typical disc and traversing wheel, and

differs from others of its kind chiefly in operating means and detail design. Contact is made by a compression spring whose pressure is adjustable. This is set to give pressure enough to a little more than drive the car under ordinary road conditions. Pressing forward a "clutch" pedal releases this contact. For transmitting an unusual amount of power, as in heavy going or while climbing hills, another pedal is used which forces the disc directly against the wheel through a linkage. The position of the sliding wheel is regulated by means of a hand lever.

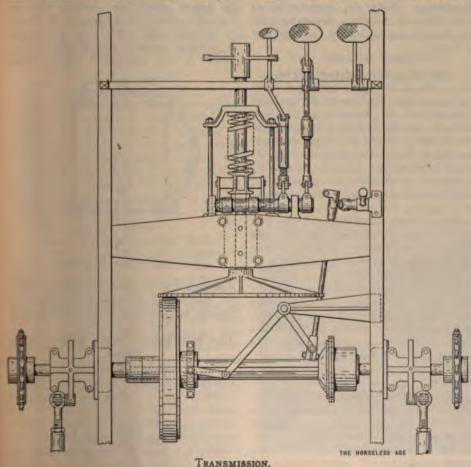
The frame is a typical pressed steel construction. The front axles are tubular. Special attention has been paid to the spring suspension, a good many combinations having been tried out before the present set of four semi-elliptics was adopted. The tires are 32 by 3½ inch on both models. The gasoline capacity for the touring car is 15 gallons and that for the runabout 20 gallons. The runabout has a wheel base of 108 inches, while that of the touring car is 115 inches.

The standard colors are English violet for the runabout and violet purple for the touring car, black and gold striping being used on both models. U & H magnetos are fitted at an extra cost.

# The Avery Farm and City Tractor.

The Avery Company, of Peoria, Ill., has recently added to its line of farm machinery a farm and city tractor designed by J. B. Bartholomew, its president. This new machine is the result of two years and a half of study and experiment. One of the tractors has been completed and is undergoing tests in various lines of work for which it is adapted.

The tractor has a four cylinder gasoline motor mounted in front. The chassis will





THE AVERY FARM AND CITY TRACTOR.

accommodate either a truck platform or a tight box, a rack or any form of bed for carrying loads. It will also pull three or four 14 inch plows, pull a drag or scraper for smoothing public roads and haul loads on ordinary farm wagons and other vehicles behind it.

The motor shaft extending in front is to be provided with a suitable pulley and can be used to shell corn, run a small individual farmer's thresher with 22 inch cylinder and 36 inch rear, including all the attachments; pump water, saw wood, bale hay and do various other jobs that need to be done on the average farm.

The wheels of the tractor are fitted with a steel rim perforated and studded with 2 inch hard wood plugs, which are claimed to enable it to run smoothly and silently on paved streets. It is claimed that these plugs will wear for a great many years and can be renewed at very slight expense. The manufacturers state that these wheels will not damage the paved streets, so the tractor can be used for all kinds of hauling and trucking for city use, as its hauling capacity is three tons on its own wheels, in addition to the weight of the tractor, which is 4,600 pounds. The speed of the machine on the public highways is 10 to 12 miles per hour, and the tractor is said to be capable of climbing the steepest grades with its load.

# New Veeder Motorcycle Trip Cyclometer.

The Veeder Manufacturing Company, of Hartford, Conn., have recently placed on the market a type of cyclometer which is especially adapted for motorcycles. Small attachments used on motorcycles are subjected to very hard usage, and it is with this knowledge that the new motorcycle trip cyclometer has been constructed.

The case is increased in size, the gearing is heavier, and it is equipped with a larger star-wheel than regularly used on a bicycle cyclometer, and the large motorcycle striker with the adjustable bracket which is regularly supplied makes it altogether a most durable instrument, it is claimed.

The adjustable bracket is a feature which deserves special mention. This bracket can, by simply loosening one nut, be made to fit any American or foreign motorcycle. This can be readily appreciated by the dealer, who before has been obliged to stock with special attaching fixtures for various makes of motorcycles.

The mile figures are in white with black background, the tenths of miles in red, black background. With this combination of color the rider can easily distinguish from the seat the reading of his cyclometer at all times.

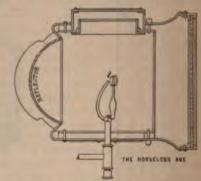
## The Wunder Button Light,

As a result of experiments begun about three years ago, the Wunder Button Light Company, of 242 Lafayette street, New York city, has developed and just placed on the market a fixture to replace the usual fan shaped flame burner used in automobile acetylene headlights. It consists of a burner producing an intensely hot pencil flame, which is directed against a button consisting of a material the composition of which is withheld by the manufacturers. The button becomes incandescent on the side against which the flame is directed, and the light striking the mirror of the lamp is reflected in the usual way.

The color of the light produced is whiter than that of the ordinary acetylene burner flame, and the spectrum of the light shows that the percentage of blue and green rays is greater than in an acetylene flame. The makers claim that about one-half the quantity of gas used by an ordinary burner is sufficient to produce a light of the same candle power, but of greater penetrating power, because of the small loss by sidewise light radiation and also by the elimination of the heat radiation inseparable from a luminous flame, due to the blue flame produced by the burner, which radiates but

little heat. The flame may be reduced or turned down and operated so that very little light is produced and may be instantly increased to full brilliancy without the disposition of carbon in the burner. It is necessary, however, to provide the gas under a pressure of about 2 pounds per square inch, making it necessary to alter the gas generator for this pressure or to use a gas tank. In the event of too much gas being fed to the burner the flame will be extinguished and thus protect the lamp.

The burner is interchangeable with the regular types of acetylene burners used in lamps, and consists of a hexagon block into which is secured a tube bent as shown by the illustration. Gas is admitted to this tube through a nozzle from four to six thousandths of an inch in diameter, and mixes with atmospheric air, which is drawn into the burner through four holes about one-sixteenth inch in diameter, located close to the nozzle. The button consists of a thin brass tube thirteen-sixteenth inch in diameter and one-quarter inch long, having an annular groove in the centre for holding the light giving material with which it is filled. This material resembles a combination of pulverized marble and asbestos, which has been compressed. The button is secured to the burner by means of a wire clip encircling it. The ends of the clip fit into a tube secured to the top of the burner by a stud and nut. This serves to hold the button in the focus of the mirror of the lamp, and the flame being directed against the side of the button nearest the mirror, that is, toward the front of the lamp, the likelihood of cracking the mirror by the flame is therefore entirely eliminated. In addition to the automobile type burner



WUNDER BUTTON HEADLIGHT.

described, the company will shortly begin the manufacture of apparatus suitable for interior and exterior garage illumination.

# The Rohrbacher Auto Power Tire Pump.

The Rohrbacher Automatic Air Pump Company, Ltd., corner G and Third streets. Blaine, Wash., are marketing a power air pump which, with slight changes in the supporting brackets, can be fitted to almost any existing car. The pump is driven by means of a paper friction pulley from the engine flywheel, being put into engage-

ment by means of a lever. The pulley shaft lies in the centre line of the pump cylinder, and extends into the crank casing, where its rotary motion is changed into a reciprocating motion. The pump is of the single cylinder type, the cylinder being provided with circumferential cooling flanges at its outer end, and inlet openings at the inner end of the stroke. The outlet is located in the head of the cylinder



ROHRBACHER TIRE PUMP.

and contains the usual check valve. The evlinder has a bore of 11/2 inch and a stroke of 2 inches, and the pump is claimed to inflate a 31/2 inch tire to 70 pounds pressure in less than two minutes. By means of gearing inside the crank case the speed of the driving pulley is reduced in the ratio of 4 to 1, cast steel and bronze gears being used. The pump is claimed to deliver any pressure up to 200 pounds, and a gauge is furnished to register the pressure.

The Demotcar.
The Demotcar Company, of Detroit, has just been incorporated under the laws of Michigan. The company is planning to manufacture a small runabout in large numbers to sell at a moderate price. The name is a contraction of the words Detroit Motor Car Company. Detailed information regarding the company and its product will be given in an early issue.

# The Marmon Touring Body.

In the body of the 1910 Marmon car no wood is used except for the mahogany dash, the floor, and a thin strip between the frame and the body. All the rest of the body is of metal, the lower section being of cast aluminum and the complete doors of the same metal. This construction does away entirely with the possibility of shrinking and warping, and consequent misfits of doors, seats, etc. At the same time it gives considerably greater strength to the body construction.

## New Franklin Features.

The H. H. Franklin Manufacturing Company, Syracuse, N. Y., have just issued a bulletin to dealers containing their 1910 announcement, from which we take the following:

A new air cooling system will be used on all 1910 motors. Each cylinder will be provided with vertical cooling flanges, and surrounded with a sheet metal casing open at the top and bottom, and a diaphragm will connect the casings and form an air-tight compartment with the engine boot. At the rear of this compartment is located a flywheel fan which draws air through the casings surrounding the cylinders, whereby the engine is claimed to be perfectly cooled. No front fan is used,

Extra large tires will be used on all 1910 models, viz., 37x5 inch and 36x41/2 inch on the Model H, 36x41/2 inch and 36x4 inch on the Model D, and 32x4 inch and 32x31/2 inch on the Model G. The company state that it will not be necessary to carry extra tires on any of their 1910 models. No spark lever will be fitted to any of these models, the spark point being fixed on all, the same as it was in the 1909 Model G. Quite a variety of bodies will be furnished with the different models, as follows: The six cylinder, 42 horse power chassis will be equipped with seven passenger touring, close coupled, double rumble seat runabout, and limousine bodies; the four cylinder, 28 horse power chassis will be equipped with five passenger touring, close coupled, double rumble seat runabout, landaulet and limousine bodies; the four cylinder, 18 horse power chassis will be equipped with four passenger touring, six passenger town car, runabout (with hamper), single rumble seat runabout and double rumble seat runabout bodies.

# Two Imperial Companies.

The Imperial Motor Car Company has been organized at Hamilton, Ohio, with \$500,000 capital, and the following officers: G. A. Rentschler, Geo. H. Helvey, C. U. Carpenter, Geo. Stanley Helvey and Fred D. Rentschler. Mr. Carpenter is president of the Herring-Hall-Marvin Safe Company and George Helvey was formerly general superintendent of the Hooven, Owens & Rentschler Company, while Stanley Helvey was formerly connected with the Allis-Chalmers Company, of Milwaukee. The new company has purchased the old Snider paper mill property near the fair grounds.

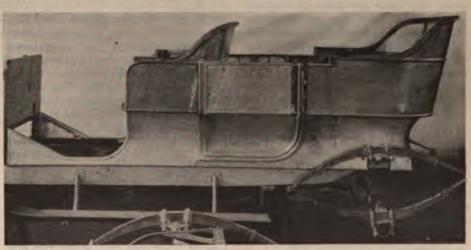
The Imperial Automobile Company has been organized at Jackson, Mich., to succeed the Jackson Carriage Company. The following officers were elected at a recent meeting at the office of the company on Washington street: B. M. Delamater, president; H. S. Reynolds, vice president; Franklin Tiffany, treasurer, and T. A. Campbell, secretary. These officers were also in control of the Jackson Carriage Company during the two years of its existence. The new company will continue the manufacture of the line of carriages turned out by its predecessor, and will in addition produce two models of automobiles, a 30 horse power car to sell at \$1,500 and a 40 horse power car at \$1,800.

# Rambler New York Agency Taken Over by the Manufacturer.

Thomas B. Jeffery & Co., who last year established a New York branch to control the sale of Rambler cars in New York and contiguous territory, have taken over the retail business of the Rambler formerly handled by the Homan & Schulz Company, New York city, and moved it to 38-40 West Sixty-second street, where the wholesale depot has been located for the past ten months. The Rambler now has branches located in Boston, New York, Cleveland, Chicago, Milwaukee and San Francisco. At each point a complete line of current models is exhibited, together with a full line of

# To Market Kenerson Dynamometer.

The transmission dynamometer invented and patented by Prof. W. H. Kenerson, of Providence, R. I., is now being built and marketed by the Builders' Iron Foundry of that city. The dynamometer was illustrated and described in a paper read by Professor Kenerson at the meeting of the American Society of Mechanical Engineers at Washington in May last, which paper was reprinted in THE Horseless Age of May 19.



MARMON 1910 MODEL TOURING BODY.

# COMMUNICATIONS



## Helical Timing Gears.

Editor Horseless Age:

It is a fact, becoming better known each succeeding year, that correctly cut helical gearing (commonly, though erroneously, called spiral gearing) will run with far less noise than equally well cut spur gearing. That this knowledge is not wider spread, or in fact universal at present, is due naturally to the fact that the high development of hobbing machinery and the hobbing process is comparatively recent; as it is only by this process that perfect helical teeth can be machined.

The reason that the helical tooth is quieter in action than that of the spur gear exists in the fact that the angle at which this tooth is cut permits only of its gradual engagement, and as this angle is usually great enough to permit the following tooth to enter contact before the first has quite passed out of mesh, we derive what may be characterized practically a continuous contact.

Regarding the specific points to be taken care of in adopting helical gears for motor timing, the Grant-Lees Machine Company, of Cleveland, suggest as an ideal outfit the following:

Cam shaft gear, of 20 point carbon steel with no recessing.

Magneto gear, carbon steel, with no hubs. Idler gear, of cast iron, with no hubs.

It is suggested that no recessing be done in the steel gears, because, while lightening the motor is of undoubted importance, the amount of lightening possible here is really negligible, but the increase in cost for such recessing is not. Hubs should be avoided where possible, for the same reason of cost, as they prevent ganging the gears for cutting.

An important point, then, that should be held in mind by the engineer when designing helical gears is to produce blanks which can either be made automatically from the bar or, in case the blanks are of cast iron, a simplicity in construction should be carried out so as to allow ganging of gears and the smallest number of settings of the machine for hobbing and facing them.

Cast iron is recommended in place of the once customary bronze, as it is cheaper than bronze, and for this service in no way inferior. In fact, it has this one advantage, which is of higher value than at first might appear: If a bronze gear is dropped or struck accidentally, it is liable to be harmed to an extent not noticeable on inspection, but will show up later in action. If a cast iron gear is not broken by a similar accident, it will be found as good as before.

most any angle of the teeth from 12 to

20 degrees will give satisfaction, as the end thrust resulting from an angle within these limits will for this service (timing gears) be slight enough to be negligible. A pitch from 9 to 12 is usually employed, and approximately a one inch face on the gear.

That the engineers of the automobile world are coming to regard highly the advantages of helical timing gearing is well instanced by the fact that the Grant-Lees Machine Company will in 1909-10 cut timing gears of this type for something over 20 per cent. of the American automobile manfacturers (this percentage practically covering the field), which, as their use was almost unknown four years ago, certainly shows a steady and substantial growth in popularity and appreciation.

ERNEST L. SMITH.

# Horseless Age Vehicle Speed Chart. Editor Horseless Age:

Referring to our former correspondence with you in regard to "vehicle speed chart,"

quires to be perseveringly dinned into the ears of the automobile investor. It is his only insurance for his money.

No business man will embark in trade without ensuring that he can buy his merchandise, yet the too prevalent trust in the ability of the automobile engineer to produce a marketable finished article at the first shot is just as foolish. The trial shot must be had—it pays everyone. No good automobile engineer will allow himself to exhibit such overweening self confidence. The rest are the kind who encourage the investor to waste a large part of his capital, thus begetting a feeling of insecurity throughout the trade and a want of support, induced by Investor A hearing how much Investor B lost in "automobiles,"

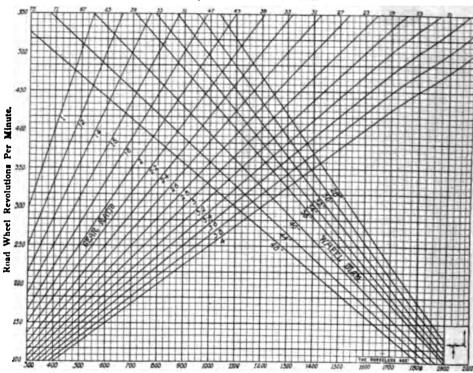
HUGO C. GIBSON.

# Incarcerated for Loss of Number Tag.

Editor Horseless Age:

Last Saturday afternoon I was, with my wife, driving my automobile along River-

Vehicle Speed in Miles Per Hour.



Engine Revolutions Per Minute.

which was published in THE HORSELESS AGE in the year 1907, we would ask whether, as stated in your letter, you have ever enlarged this chart for greater ranges of engine revolutions and of vehicle speeds. If such is the case, we would be pleased to have a copy of this chart sent us.

E. DE N. SANDS. extended, is printed

[The chart, suitably extended, is printed herewith.—Ed.]

# Haste in Marketing New Models. Editor Horseless Age:

I noted your editorial on "Injudicious Haste in Marketing New Models" in your issue of July 7 with much satisfaction, inasmuch as it is my belief that that note re-

side drive when I was halted by a bicycle policeman, who informed me that I had no license number displayed. This was the first knowledge I had of the fact, as the number was on the machine when I started from the Cimiotti Garage. However, evidently the wire had broken and it had dropped off. I was placed under arrest and taken to the police station on rooth street near Amsterdam avenue and locked up in a cell for nearly an hour until my wife returned with a bondsman for \$500.

It seems to me the law should be modified to the extent of allowing the lieutenant at the station house some discretion as to the incarceration of a prisoner pending arrival of bail. I understand he has none.

It seems absurd to sequester a man in a cell under such circumstances. The truth of my story could have been easily substantiated by the least investigation, inasmuch as my garage and my residence were within a few blocks of the station house, and both had telephones. I myself am well known. I am in business in this city and president of several large corporations, and until recently was president of one of our national banks. My automobile was in custody of the police during the episode, and was of itself a sufficient guarantee that \$500 bail would be furnished. I was not allowed to telephone from the station house nor permitted to go outside in the custody of an officer to do so. It is not within the discretion of the lieutenant to allow a prisoner to telephone, I was told.

The next morning Judge Barlow, of the Fifty-fourth Street Court, gave me an immediate discharge on hearing the testimony.

It is such cases as these that destroy in every class of society all reverence for the law in America and go to explain why automobilists in particular make such strenuous efforts to escape arrest.

"ZANZIBAR."

# Compression in Two Cycle Motors. Editor Horseless Age:

Being a reader of your paper I want to ask the following question: How many pounds compression are necessary for a 4x4½ inch two cycle motor? H. A. B.

[The most practical compression pressures are about 8 pounds per square inch in the crank chamber and from 70 to 75 pounds per square inch in the cylinder.—Ep.]

# Offsetting Cylinders.

Editor Horseless Age:

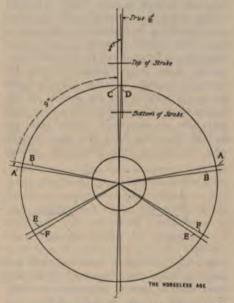
Nothing could be more interesting than the discussion of such a subject. It is important, because nothing has been clearly proven so far, inasmuch as such tests as have been made have usually been subject to the objections that the elements of accuracy have not been present. This does not say that they are all inaccurate, but that they may be, and, therefore, should be taken cum grano salis.

The article by Mr. McIntosh in your issue of July 21 is valuable as far as it goes, as showing that there may be something in offsetting for low speed engines, and I firmly believe there is, but such tests as are reported therein are at least liable to be misleading for the following reasons:

An engine which will show an increase of horse power by advancing the spark to 80° early must be using a very polluted mixture, and consequently be unsuitable. But, on the other hand, this figure was probably merely a mechanical measurement of the assumed time of ignition. Hence the question arises, Where did the spark occur, and if it occurred at a certain place during the forward operation of the engine, did it also occur at a similar angularity dur-

ing the reverse operation? Obviously it did not. The accompanying sketch shows clearly why not, when taken in conjunction with the fact that your contributor arranged for the spark to occur at certain fixed points irrespective of the direction of rotation of the engine, no allowance being made for the effect of the offset on the spark time. In my sketch the lines A, A' represent the time of ignition as used by your contributor, and which would be correct for a straight engine, while B, B' show the correct time that should have been employed. The result of this is that when the engine was running astern the spark was retarded over 7-16 inch (measured on the 13 inch circle) as compared with its position when going ahead. This would account for considerable lost horse power.

Again, the offset produces similar results as to the time of opening and closing the ports; for instance, the ports show a dif-



ference of ¾ inch (measured on a 13 inch circle) in the position they open and close as compared with a straight engine, and no one knows what effect that would have except that all ports open earlier on the downward stroke and close earlier on the upward stroke when going astern as compared with going ahead. F, F' show the timing on a straight engine, and E, E' with ¼ inch offset. It is fair to assume that one of these timings, either E or E', is correct, and that the correct one is designed for going ahead; therefore poorer results are obtained when going astern.

Now, these variables render all results useless, and your contributor recognizes this when he says, near the end of the article, that "the engine is harder to control when changing from reverse to forward operation," etc., thus showing that the conditions are not the same.

Finally, no tests on this subject are of value unless the engine may be worked at high speed, say 1,500 r. p. m., for automobile engines are essentially high speed engines, and all investigators agree that offsetting decreases in value as a friction re-

mover as speed increases; and, further, it introduces a decided want of balance, a most undesirable result.

I heartily indorse any attempts to settle a vexed question, but it seems a pity to attempt a solution by inaccurate and misleading methods. Hugo C. Gibson.

# A Few Thoughts on Driving.

Editor Horseless Age:

Almost anyone thinks he can drive a horse. Yet how few really good drivers do we see on the road! The matter seems simple enough. Just hold the lines, and when you wish to turn to the right pull on the right line, and if to the left on the other; how simple it all is. But, alas! that is not all of it. Should the horse refuse to go, of course there is the whip. Should he back, again the whip. It really is absurd to say that everyone is not a born driver, And yet why is it that we see men and women driving horses who we know cannot drive correctly? Instead of keeping the lines taut, how often do we see them hanging down over the dash, and the horse doing the driving himself? How frequently do we see women, and even men, who are supposed to know better, holding the hands far apart and extending them to the right or left when they wish to turn, or even raising them above the head when they wish to stop?

It is a beautiful sight to see a good driver handle a fractious team in a bad place, always keeping them under perfect control with apparent ease. But let any auto driver give his experience in meeting and passing teams, and we will discover how few really good drivers there are on the roads. I recently had a little experience with one of the exceptions.

I met a young man and lady in a buggy in a narrow place on a grade with a ditch on either side, and the team was young and fractious. I stopped my car and engine as far to one side as I could, and sprang out to assist him by, but the team sprang to the right with their fore feet down in the ditch, where he held them steady enough for me to assist the lady to the ground. Then he swung the team around as it were by mere force of the lines, lifting them out of the ditch, and coming up facing me once more when I led them dancing by the machine to receive his thanks for my courtesy. But the thing which struck me most forcibly was his masterful management of his horses. He did not touch the whip, but instead talked all the time to the team.

It is not often we meet such drivers, and when we do meet them, if we give them a chance, such as we would like ourselves under similar circumstances, they always appreciate it, and feel kindly toward us for the thoughtfulness. It is not courtesy thrown away to do all that we can to assist horse drivers when we meet them, and a little care shown at such times will do far more to settle prejudice among horse-

men than all the talking we might do from now till doomsday.

But I did not set out to tell about the correct way to drive horses, as that is something which can only be learned by long practice, and all the lecturing in the world will not make good drivers of some men. I wish to mention a few things which ought to be known and practiced by every driver of an automobile.

In the first place, we all know that the horse is a dangerous animal when once frightened, and no man can tell just when he is going to scare. If we who drive autos would only give the horse driver the best of every meeting, we would do more to disarm the autophobe than we could in any other way. It is a duty we owe to the community to help the other fellow in every way possible, when we see that his team is frightened. In fact, it is much better to do more than is required of us by law than to be bumptious and claim every right we can, for the simple reason that our horses will not scare, and the other fellow's will. If we rush recklessly by, apparently not caring what occurs to the other man, we are guilty of gross negligence and a lack of courtesy which ought to drive us from the highways. The burden of responsibility rests with the driver of the automobile, for he can never tell just what the team or its driver will do. It is unwise to expect anything of him, for you do not know anything about his skill or courage, and a little inconvenience for you may save a bad accident which endangers life or limb. The fact that it is the other fellow's life that is endangered makes no difference, so far as responsibility is concerned. It is far better to take even unnecessary precaution than to have to regret all one's life that it was not done.

We read a great deal about automobile accidents in our papers, and think nothing of them, but nine times out of ten they arise from too little caution on the part of the automobile driver. Too much speed at the wrong time, taking turns carelessly with no regard to conditions, taking chances merely for the fun of it, or neglecting to look after the condition of brakes and other parts of the mechanism, are the greatest causes of accidents to be met with. And vet young men who have not learned the need for caution, or the common courtesies of the road, are constantly doing things which would make an old driver shudder. It is criminal to allow such men on the road. It not only endangers the lives of those who ride with them, but, what is worse, it puts the lives of other road users in jeopardy unnecessarily.

I do not wonder that there is a certain class of road users who are constitutionally against the use of the automobile. The fault does not lie so much in the fact that horses will scare as in the careless and unwarranted use of the auto. Let us not be deluded by the cry of the thoughtless that we have as much right to the road as has orseman, but remember that all users

of the public highway are morally in duty bound to protect the rights of others as well as to maintain their own. If the rights of anyone are to be interfered with let it be those which we claim, rather than to impose upon the other fellow. I do not mean to preach, but to ask for simple justice, and that moral courage which would rather suffer an injustice than to impose it upon another. Do right, be courteous, kind and considerate, and the roads will be safer, and prejudice will die a natural death.

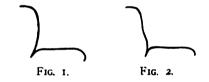
E. H. VAN PATTEN.

[It should be pointed out that our correspondent writes from the State of Washington, where horses in general are not "automobile broken" to the same extent as in the East.—ED.]

#### Comfortable Seats.

Editor Horseless Age:

I have noticed a considerable difference in the shape and dimensions of the seats of automobiles, irrespective of the cost of their construction. I refer to the outline which would be produced by a vertical foreand-aft plane section passed through the centre of the seat. In some cases the backs are nearly vertical, like the pews in an old-fashioned church; in others they slope back more like an easy chair. Some seats are so high above the floor that many persons who are only a little below the average



height when sitting in them find their feet dangling in the air. The depth of the seat from front to back is frequently too small. Such seats are not restful, unless to unusually short persons.

An important feature in which carriages and railroad cars, as well as automobiles. differ much is in the shape of the back. In many cars, perhaps the majority, the back is shaped like Fig. 1. I believe, however, that a shape similar to that shown in Fig. 2 will be found more comfortable by the average person. It produces the effect sometimes sought with a chair by placing a pillow behind the lower part of the back. I first noticed the comfort of this shaped back in a Locomobile of 1906, and afterward in some railroad cars and carriages, but I have not had any opportunity of observing to what extent this shape is used in well known cars of the present time. Are there not some shapes and dimensions which are "standard," and which give the most comfort to the average person? On a long journey defects in the shape of the seats produce as much or more fatigue as improper springs. Can you give me any information on this subject?

W. S. DAY.

[We doubt whether there is anything "standard" in automobile body designs. Per-

haps some of our readers experienced in this line of work can throw light upon the subject.—Ep.]

Does Retreading Pay?

The Fisk Rubber Company make the assertion that 90 per cent. of the old tires which are retreaded ought not to be, as far as an owner's interests are concerned. The manufacture of rubber and the repairing of tires is a science that takes years to master, yet apprentices will work a few weeks in a garage or tire repair shop, and, thinking they know it all, branch out in business for themselves. Some of them will undertake to retread any old worn-out shoe that is brought to them, for if they were conscientious and advised a customer that the repair would not be worth while they would starve.

An owner may have a casing that has given him a few thousand miles of good service, and is still apparently in good condition. He consults the manufacturers of that tire in regard to having it retreaded, and they advise against it on the ground that the inner fabric is too much worn, and affirm that a new tire would be more economical for him. The motorist then goes to the nearest "tire repair expert." The latter informs the visitor that the tire company is all wrong. The Fisk Company state that repairers, as a rule, use only the poorest, cheapest quality of scrap rubber and the crudest methods. Should the old, played out, retreaded tire last only a week or so. due to improper vulcanization and curing, the motorist has no redress from the repair man, who does not guarantee his work, and coolly tells the owner his tire "was no good in the first place." The unscrupulous repair man has no reputation to lose, and is not greatly worried.

If a tire has not been driven at the proper degree of inflation it is almost certain that the fabric has been strained so that recovering is useless. In view of the fact that to vulcanize and cure a tire requires fifty-five minutes of heating at a temperature of 55° centigrade, it is easy to understand that this process is going to weaken fabric that has already been strained.

Tire manufacturers, as a class, are honest with their customers. If a tire can be retreaded and give hundreds of miles additional riding, it speaks well for the manufacturer's product, and he is glad to be able to do it. When a manufacturer advises against it, however, it is the best plan to take his word and buy a new shoe. We are informed that during the past two years a motorist of Orange, N. J., has had two Fisk rear casings recovered three times, and has gotten more than 13,000 miles out of each of them. He is one of those who know how to keep their tires inflated properly.

The Royal Automobile Club of Great Britain and Ireland now has a membership of 16,307, an increase of 2,302 during the past half year. The club has 96 clubs associated with it.

## Commercial Applications.



#### Electric Trucking at a Big Textile Works.

BY ALBERT L. CLOUGH.

The Amoskeag Manufacturing Company, Manchester, N. H., who are one of the largest producers of cotton and worsted textiles in the country, introduced electric haulage into their plant about two years ago. A 3 ton Columbia truck constituted the original installation, which has grown so that it now includes four trucks of capacities ranging from 1½ to 5 tons, three of these being Columbias, and one—the latest accession—a product of the General Vehicle Company.

Specifications are now in preparation for another vehicle, and two or three more will, it is understood, be purchased in the near future. It evidently is the intention of the management ultimately to entirely supersede horse haulage within the plant, which covers about 150 acres, and includes about 15 miles of concrete and block paved

Those in charge freely admit that there is a substantial saving effected by the use of electric vehicles, as compared with horse drawn drays, and the rapid extension of the service would indicate that this economic advantage is being embraced.

#### GARAGING AND MAINTENANCE.

The garaging and maintenance of this fleet of cars evidence advanced practice, and a few details may be of interest.

The garage affords a floor space 70x90 feet in extent in a brick and steel building, with tar concrete approaches. The floor is of cement concrete, drained to a cesspool with sewer connection. The fin-

ish of the interior is white, except that a dark green is used on walls and posts to a height of 4 feet. General illumination is afforded by enclosed arcs, and each post carries a receptacle from which flexible cords reach every portion of the building. All wiring is in underground conduit or in molding. Automatic sprinklers are installed, as well as a standpipe, with hose sufficient to reach to any part of the floor.

Heating is by overhead radiation from the company's steam plant, and there is a hot water supply to the employees' toilet room and to the washers' sink.

A compressed air supply is derived from the company's air pressure mains for cleaning and for tire inflation.

#### EQUIPMENT. "

Around the sides of the room are arranged the following: An oil cabinet containing three 60 gallon pump tanks, for kerosene, cylinder and lubricating oils, and a grease supply; private lockers for each chauffeur; drawers for general supplies; individual lockers for the spare parts of each car; spare solid tires for each car, accessibly fastened to the wall; compartments for waste; shelves for spare cells; racks for metal stock to be used for side wires for the tires; a stock of side wires brazed up for use, as well as a compartment to contain the carboys of electrolyte; a long bench supplied with vises and a full kit of machinist's and electrician's tools. Around the ceiling runs a special pipe carrying distilled water, which leads from the distilling apparatus to four carboys located upon shelves carried by the posts of the building. Any particular carboy can be filled from the distiller by opening a valve in its branch to the main pipe, and each carboy is fitted with a rubber draft tube, with pinch cock, through which distilled water can be obtained by gravity. These tubes reach all parts of the floor. The still itself consists of a water jacketed worm fed with clean steam from the main steam supply. \*

Toward the back of the floor is located the drained concrete washstand, and under each car is a drip pan made of galvanized iron, coated with asphaltum, to resist the action of spilled electrolyte.

#### CHARGING.

To one side of the main runway is located a track upon which, a car may be run. Between the guide rails of this track is the platform of a direct acting hydraulic elevator used in changing batteries. A car is run over the elevator, the battery lifted by the elevator and unhooked, and the elevator lowered, when the car may be run out of the way by hand. A chain falls on an overhead track is used to lift and convey the batteries to wheeled trucks.

The inspection pit is conveniently located close to the elevator, so that an inspection may be made without moving the car materially.

A tire setting machine is installed, capable of handling the largest wheels and tires, and a chain falls is provided above it to lift the wheels into place.

Portable tanks for oxygen and hydrogen, together with the necessary tubing and blowpipes for lead burning are also at hand.

The charging facilities are as follows: Direct current at 125 volts is obtained from a 50 horse power motor generator set, consisting of a 550 volt, sixty cycle, three phase General Electric motor, direct connected to the direct current generator. This set can be operated either by current from the company's 10,000 kilowatt private plant or from the lines of the local lighting company. The switchboard consists of the feeder panel and ten charging panels. The former carries a total alternating circuit and a total direct current ammeter and circuit breaker for the direct current side, together with a ten point back connected



ELECTRIC TRUCKS USED BY AMOSKEAG MANUFACTURING COMPANY.

rotary voltmeter switch and voltmeter for indicating the voltage of the charging circuit. There is also a Bristol recording ammeter, the cover of which is locked, and its record acts as a check upon the employees as to the times of starting and stopping the charging and the number of cars on charge.

Each charging panel carries its individual circuit breaker and ammeter and double pole, double throw switch. One position of this switch connects to the charging bus and the other to the discharging bus. In the latter is an adjustable water rheostat, consisting of a wooden tank carrying two movable copper plates in dilute sulphuric acid. This tank is fitted with water supply and a sewer connection. A total ammeter is cut into the discharging circuit. Back of each charging panel is a Cutter-Hammer rheostat of sufficiently wide range as to vary the current from 60 down to 5 amperes. This admits of the charging of ignition batteries as well as the vehicle batteries.

Charging plugs are located upon each post in the garage, a special very heavy cable being employed. Special holders are provided for these plugs, when not in use, so that they may not be defaced by rough usage.

Sand boxes are provided upon these cars and a large sand supply is carried within the garage. The sand to be used is passed through a compartment in which is a steam coil, so that it is thoroughly dry before being used and its free feeding is assured.

#### SPARE EQUIPMENT.

The spare equipment consists of three complete batteries on trucks, ready for instant use, a full line of spare tires, spare chains and gears, controller fingers, brush rigging and other small parts, spare cells and elements and the like. The policy is followed of standardizing the equipment, as far as possible, in order to minimize the necessary stock of spares.

When a battery is put upon the spare list it is always charged at a very low rate, not exceeding 10 amperes, as time is no object and beneficial results are thus obtained.

The nightly service charges of the batteries are of twelve hours' duration and at a considerably lower rate than that specified by the battery manufacturers. Hourly readings of voltage, amperage and temperature for each battery are taken and the reports turned into the office,

#### INSPECTIONS.

Every night, after 6 o'clock, the attendants make an inspection of each car. This includes the examination of commutators and controllers for burning and the filling of such cells as need it with distilled water. A certain cell is selected from each battery and known as thes pilot cell. During charge, at stated intervals, the gravity of this cell is noted and is turned in on the report. Any chauffeur noting any defect in his car describes it upon a special trouble card, which is turned into the office at the end of the day's work. This card, when



GARAGE OF AMOSKEAG MANUFACTURING COMPANY, MANCHESTER, N. H.

approved, is given to an attendant with instructions to rectify the defect. Chauffeurs report for duty in the morning in time to do the daily oiling and a general inspection. From Saturday night until Monday morning each car is given a thorough mechanical inspection, which includes gears, chains, brakes, bearings and all other parts. During the charge, which takes place within this period, the gravity of each cell of each battery is taken and reported. This locates at once any "sick" cells, and if such are found the battery is removed, a spare one substituted and the defective cell cut out at leisure. The voltage of each individual cell is taken at the same time with the gravity, and is important in locating trouble. On these weekly inspections it is frequently found necessary to strengthen the electrolyte, as pure water only is added during the week, and spraying and the rapid evaporation resulting from heavy work in very warm weather call for a considerable amount of replenishment of liquid during the week. On the weekly report sheet each cell has a number. A blue print of each battery is posted in the garage, with each cell of each battery shown numbered. This makes identification easy and certain, and if a cell of a certain number is ordered cut out it can readily be done without chance of mistake.

#### WASHING OF BATTERIES.

It is the practice in this installation to wash each battery three times during its life, replacing all wood separators and performing the washing of the plates with a fine spray of water, under light pressure. The time for a washing is indicated by the rise of the deposit in the bottom of a certain cell in each battery that is subjected to the maximum heat conditions. This cell is kept under observation, and when its deposit rises to within one-quarter

inch of the bridges the battery is put out of service for washing.

Rubber gloves, high rubber boots and rubber aprons are furnished the men who do this work. After the battery is washed and assembled it is given a slow charge, to its full capacity, but it is not at once sent out on a car. It is first discharged and the discharge capacity must be up to the standard or it will be reserved for further "bringing up."

It is the experience of F. A. Clark, the engineer in charge of this service, that it is advisable to entirely renew a battery—negatives, positives and separators—at the end of one year, under the conditions here met with. Each car is run from 20 to 25 miles per day for 300 days per year, and thus each battery gives a mileage of from 6,000 to 7,500. In this installation it has been found inadvisable to renew the positives only and to use the negatives with another set of positives.

On the average, one set of solid tires, of the particular make used, lasts for 5,000 miles.

All cars are washed each Sunday, no more frequent washing being required, as nothing but pavement is traversed. Tops are carried only in rainy or very hot weather, and are kept slung to the ceiling, on falls, at other times.

All loading platforms correspond in height to that of the cars. The operators are mostly former horse dray drivers who have been in the company's employ for a considerable time.

#### ROUTES.

Each car, with one exception, has a regular route, which is followed day after day, until orders are changed. That the rather unusual precautions taken in the operation and maintenance of these trucks secure excellent reliability in service—a qualification which is of exceptional importance here-is shown by the following figures: One truck was out of service 44 hours out of 4,500, and two others 65 hours and 18 hours, respectively. In other words, they were out of commission about I per cent., 1.4 per cent, and 0.4 per cent, of the time they were in service. The equipment of horses for a truck has been found to be out of service, for the purpose of shoeing alone, a greater proportion of the time than this.

The new trucks, with single motor equipment, commutated field control, silent chain transmissions and anti-friction countershafts and wheels, are found, in this service, to do the same work with a 30 per cent, less expenditure of energy than the older trucks with double motor equipments, series parallel battery control, spur gear reduction and plain bearings.

One other business vehicle in the service of this company is a 18-22 horse power A. L. Co. gasoline taxicab, which is kept busy in taking the officials on business trips and conveying visitors to and from the railway station.

#### Milwaukee's Municipal Cars.

The Milwaukee (Wis.) Common Council has voted to purchase a runabout at \$1,000 for the health department. Commissioner Bading believes his force of inspectors will save 50 per cent. all around. The council has also authorized the purchase of a Pierce-Arrow touring car for the Milwaukee police department, bureau of detectives. The department has in use a motor patrol wagon. The purchase of a Peerless touring car for the joint use of council committees and the Board of Public Works, delayed several months by injunctions, finally has been authorized, and the car has been paid for.

With more than fifteen municipal cars in Milwaukee, and the growing possibilities of city officials in the direction of using the cars not always on strictly official business, an ordinance has been introduced providing that all cars shall be labeled in large letters with the name of the city and the department using the car. This would effectually stop the use of the machines for social occasions.

#### Minneapolis Now Has a Motor Patrol Wagon.

The city of Minneapolis has been using a Rambler Model Forty-five car, equipped with a special body, in the patrol service for the past two months. We are informed that the car has been in active service every day, and on one occasion eighteen people, including four officers and fourteen prisoners, were carried after a raid on a gambling outfit 3 miles outside of the city. The car was built to carry but ten passengers. The vehicle is electrically lighted, and is equipped with the Rambler spare wheel. A duplicate of this car will be purchased by the city of Minneapolis for use as an ambulance.

Progressive Cemetery Company.

The Forest Home Cemetery Association, of Milwaukee, Wis., owning the largest cemetery in the Northwest, has decided to purchase a motor bus for the convenience of the thousands of daily visitors.

#### Commercial Notes.

The Frank Bird Transfer Company, Chicago, Ill., have placed an order for three 24 horse power taxicabs with the Coppock Motor Car Company, of Chicago. The first of these cars have been delivered.

H. W. Horton and T. S. Hubbard, of North Wilkesboro, N. C., will shortly open an automobile service between North Wilkesboro and Taylorsville, a distance of 20 miles, part of the road leading over a

The post office of Fall River, Mass., will shortly put three Maxwell cars in service for the collection of mails. A request for the authorization to use automobiles for the work was made to the Post Office Department at Washington some time ago.

Harry E. Pence will start a taxicab service with twenty-five Buick cabs of 40 horse power in Minneapolis, Minn., on August 1. The cabs were to have been delivered on June 15. The rates charged will be the same as those now charged in New York, viz., 30 cents for the first half mile and 10 cents for every quarter mile thereafter.

Howard V. Wilcox, of Atlanta, Ga., plans to inaugurate a motor bus service in Ansley Park, a suburb of that city. Mr. Wilcox plans to secure a sixteen-eighteen passenger bus, and to run it on a fifteen minutes' schedule. A reserve car will be kept in the garage for special service, while the regular car will stop at any residence to which it

The Berks Auto Traffic Company has started an automobile service between Reading and Bernville, Pa. A 60 horse power sixteen passenger Manhattan bus is used, and starts from the Farmer's Hotel, Fifth and Washington streets, Reading. Three round trips will be made per day. The distance is 14 miles, and is covered in less than an hour and a half. The single fare is 60

Wm. Bomsack, a rural mail carrier de-\* livering mail from Grand Rapids, Mich., who recently purchased a runabout with a special interchangeable body, now covers his route so quickly that he is able to conduct an auto livery business in his spare hours. He usually leaves the post office at 8 o'clock a. m., and returns at 10:30 a. m., where formerly, with a horse and buggy, it took him from 8 a. m. to 3 p. m. to cover

#### Rapid Company Increases Capital.

The Rapid Motor Vehicle Company, Pontiac, Mich., at a stockholders' meeting held on July 20 decided to increase its capital stock from \$250,000 to \$500,000. The new capital will be invested in additional buildings and machinery, according to plans

published in our last issue. It is reported that \$200,000 of the new stock was taken by W. C. Durant, of the General Motors Company. This will leave the control of the Rapid Company, for the present at least, in the hands of the Pontiac interests.

#### Deficit of the Crown Point-Lowell Races.

It now appears that the recent Crown Point, Ind., races will not pass into history without a sequel in the form of a lawsuit. F. J. Lewis, of the Lewis Manufacturing Company, which put the Crown Point-Lowell course into shape for the races, has announced that he is preparing to sue Ira M. Cobe, president of the Chicago A. C., for a sum of approximately \$8,000, part of the money due for work on the course. The contract made between Mr. Cobe as president of the club and the Lewis Company was for \$21,600. The club paid approximately \$13,000 on the contract, and then ceased further payment, alleging that the Lewis Company failed to carry out its part of the contract and keep the course in good condition. The payment to the contracting firm was guaranteed by Mr. Cobe personally, and if suit is instituted it will be against him. The exact amount of the deficit caused by the races is not yet known. but it is thought to exceed \$30,000. It seems that some of the members of the Chicago Club thought that Mr. Cobe should bear the entire deficit, as he received practically all of the publicity resulting from the race. Mr. Cobe's friends assert, however, that he did not donate the cup for the sake of publicity. The Chicago Automobile Club's board of managers has unanimously voted that the club shall assume all the indebtedness resulting from the races, but that Mr. Cobe shall be permitted to aid in wiping out the deficit.

#### Consolidation Proposed.

It is reported that the Racine Manufacturing Company and the Piggins Brothers, of Racine, Wis., will be consolidated and engage in the manufacture of motor cars on an extensive scale. Piggins Brothers manufacture motors for the general trade, and have placed a number of cars of their own make on the market. The Racine Manufacturing Company has just arranged for the erection of a five story building. The new site adjoins the holdings of both companies,

#### New Motor Sleigh.

Otto J. Kirchen, of Hancock, Mich., has applied for a patent on a motor sleigh. The patent is expected to issue this month, and Mr, Kirchen will then endeavor to interest local capital in a \$25,000 company to place the invention on the market. The sleigh mechanism consists of two runners in front, to which may be attached the steering gear of any standard car. The rear of the sleigh is supported by two double runners, between which is placed a spiked chain wheel by means of which the sleigh is propelled.



## Motorist Gets Damages from Horse Driver.

One of the few cases on record in which a motorist received damages from a horse driver is reported from Crestline, Ohio.

J. M. Martin, of that town, accompanied by Mrs. Martin, was driving west on Bucyrus street in his automobile, when W. Kauffman, a farmhand, came along in a single buggy in the opposite direction. Mr. Martin kept to the right side of the road and yelled to Kauffman to stop or turn out, but the latter disregarded the warning, and the buggy and auto collided. The buggy was demolished and the auto injured. Martin entered suit against Kauffman for the damage to his auto, claiming Kauffman was at fault in not turning out. Kauffman engaged counsel to defend him, but when the latter learned the facts in the case he advised his client to settle, which he did.

#### Rulings on Ohio Law.

The Attorney General and the State Motor Vehicle Department of Ohio have recently made several important rulings regarding the application of the State motor vehicle law. The department has decided that when a member of a family owning a car drives the vehicle it is not necessary to take out a driver's license. Identification by tags is considered easy when the car is driven by the owner or a member of the family. The Attorney General, on the other hand, has decided that when a car is owned by a corporation and used by many of the officers and stockholders each one will have to provide himself with a driver's license as chauffeur, because the ownership of the machine by the corporation does not identify the officer and stockholder.

#### Anti-Taxicab Ordinance.

An ordinance has been introduced in the Milwaukee (Wis.) Common Council by Alderman Henry Smith, aged seventy-six years, prohibiting taxicabs or motor vehicles for hire from occupying any part of Grand avenue, and relegating them to the side streets. Mr. Smith says the streets are too valuable to be "obstructed" by these vehicles. The ordinance does not relate to hacks or cabs drawn by horses, and therefore it is unlikely that the council will discriminate by passing the measure.

## Want to Tax Autos as Personal Property.

At a recent meeting of the State Tax Commissioners and Supervisors at Riverhead, L. I., N. Y., it was suggested that all automobiles owned in, the county should laced upon the various town assessment rolls as personal property and taxed as such. If this was done it would certainly considerably increase the revenue of the county, but it is feared that motorists would attack the measure as discrimination, inasmuch as horses and carriages are rarely, if ever, taxed as personal property; and, besides, automobiles are already taxed in a way through the licensing law, and to exact a personal property tax would amount to double taxation.

## No Motor Vehicle Commissioner for Connecticut.

The Connecticut Senate has indefinitely postponed the bill creating the office of State Commissioner of Motor Vehicles. The original bill provided for a supervisor, who should be a deputy in the office of the Secretary of State. An amendment was offered which purposed to give the Governor the right of appointing a commissioner, who should have a deputy and an office staff. The amendment was defeated, and the entire matter indefinitely postponed. Automobile registrations will therefore continue to be looked after in Connecticut by Secretary of State M. H. Rogers.

#### Members of Owner's Family Need No Driver's License in New York.

Attorney General O'Malley, of New York State, has given an opinion of considerable interest to all motorists to Secretary of State Koenig, viz., that there is no provision of law requiring the owner of a motor car or any member of his family to obtain a chauffeur's license before operating his machine.

Legal Notes.

The police of the principal cities in Ohio wish to have the State automobile law amended so as to prohibit a motor vehicle from carrying more than one set of tags, because it is claimed that when a machine has more than one set it is confusing to the police and defeats the object of the tag provision.

It is reported that at the next meeting of the city council of Rochester, N. Y., an ordinance will be introduced regulating the fares which may be charged for taxicab hire, and providing for licenses for these vehicles. At present the city has no ordinance regulating the operation of these vehicles, and hack owners and others affected by them are complaining of unjust discrimination.

## American Congress of Road Builders.

A permanent national organization perpetuating the American Congress of Road Builders, with Samuel Hill, of Seattle, Wash., for president, was agreed upon just before the congress adjourned after its three days' session in the Good Roads Building at the Alaska-Yukon-Pacific Exhibition grounds. A committee of nine was ap-

pointed to make a report on plans for permanent organization and to name the time and place of the next meeting.

A motion that it be declared the sense and desire of the congress to make Mr. Hill president of the proposed permanent association immediately followed. Both motions were carried unanimously. The following resolution was passed and Mr. Hill was presented with a cane, the gift of the members in recognition of his tireless efforts in behalf of good roads:

"Resolved, by the first American Congress of Road Builders, that in Mr. Hill, president of the Washington State Good Roads Association, we recognize a leader whose wise, energetic and constant efforts in promoting the common welfare as affected by the improvement of highways command our highest admiration. Sparing neither time nor money, with voice or pen, Mr. Hill has given an impetus to a general movement for better roads in all of the States of the American Union and the provinces of Canada, which must inevitably produce lasting benefits.

"Resolved, that the thanks of the congress are due to him and are hereby expressed for the many courteous attentions which Mr. Hill has bestowed and which the members of this association will remember with keen appreciation."

#### New Timing Apparatus.

The Warner Instrument Company, of Beloit, Wis., is engaged in the construction of a new electrical timing apparatus especially for the Indianapolis Motor Speedway, and to be ready for the dedicatory events on August 19 to 21. The apparatus will cost \$2,000, but is to be a gift to the Speedway by the Warner brothers. It is the invention of Charles Warner, assisted by Walter Baker, of Cleveland, Ohio. It consists of chronometer, chronograph, a telephone system and several other devices used in speed recording, combined so that it will be possible to tell accurately at any time the speed and mileage of any car.

#### Seek to Hold Mason Company.

The Greater Des Moines Committee, of Des Moines. Ia., has made an offer to the Mason Motor Car Company of that city to dispose of \$100,000 preferred and \$50,000 common stock of the company within the next thirty days if the company will remain in Des Moines. The concern has been negotiating with a commercial organization of Waterloo, Ia., with respect to removing there, but it is now thought likely that it will stay in Des Moines.

The British Society of Motor Manufacturers and Traders has decided not to hold a commercial vehicle show in 1910. It also has decided to abandon the project of a collective exhibit of accessories at the Brussels World's Fair, owing to the little interest in the project shown by parts manufacturers.

## OUR FOREIGN EXCHANGES ➤



#### Magneto Derangements.

Magneto troubles may be divided into three classes, viz., those which stop the firing altogether in all the cylinders, those which set up misfiring in one or more cylinders, and those which lead to weak running and loss of power in all the cylinders.

#### I .- ENTIRE ABSENCE OF SPARK,

If the engine will not fire on the magneto when the switch is thrown across from the accumulators, or if no spark be visible at the plugs when the starting handle is briskly revolved, the trouble is of the first class. It is not safe to immediately infer the trouble is of this class if the engine refuse to start on the magneto, for it might be due to (a) gummy pistons, (b) dirty plugs, (c) any common valve or carburation defect, (d) a weak spark; and, therefore, the spark should be searched for at the plugs before proceeding to treatment. After proving beyond doubt that there is no spark at the plugs at all, we may take it for granted that the trouble lies in or behind the central revolving wiper of the distributor. (There is only one exception to this, and that an almost impossible occurrence, viz., a simultaneous derangement of all four plugs, or their wires, causing the current to travel via the safety gap on all four circuits, or to short circuit via the engine.)

We can easily discover if current reaches the distributor wiper by putting a finger on it, and revolving the starting handle. A smart but not really painful shock will be felt if the finger be laid on the tip of the metal shaft on which the insulated wiper is fixed. If this shock be present, and be smart—not a mere gentle tickling—the fault is found. It lies in the spring pehcil of the wiper, which is not making contact with the four segments it rubs against. The tip of the pencil should be freed from tough scale, and the spring behind it pulled out to give better pressure.

More probably, however, no current will be felt at the wiper. In this case, dismount the distributor and ascertain if strong current can be felt in the brush which transfers the current from the magneto to the wiper (revolving the starting handle gently, of course, during all tests for the presence of current). If current be present at this brush, but does not reach the wiper, there is a short circuit between tlese two parts. Such "short" will be discernible to the eye in every case after careful scrutiny, and will be due either to dirt, oil or water, or, alternatively, to a visible crack in the insulating material. A good cleaning or application of insulating tape will provide an easy remedy.

Next, supposing current does not reach this transfer brush. In 99 per cent. of such cases the fault will be found in the contact breaker, and will be visible to the eye. It may consist in (a) the platinum points not making or breaking contact, (b) no platinum on either of the screws, (c) a broken metal part, (d) a broken insulating washer, or (e) short circuits by water, oil or dirt.

The remedies for the last four derangements are obvious. For the first no universally applicable rule can be given, since there is a huge variety of contact breakers. Fibre enters into the composition of many, and fibre is obviously liable to wear. A replacement will set things right, if the maker's case of parts be on board the car. as it always should be. If not, a little ingenuity will generally suggest a "fake." Fibre is pliable, and often a liner of wood or tin can be pushed under a fibre cam to give it a more pronounced contour. In other cases, a strip of court plaster may be overlaid to raise the hump till a spare can be procured. The most difficult type to "fake" is that fitted with small fibre discs, in which case maker's correct spares are the only cure. In some cases mere adjustment of one of the two platinum headed screws will set the points making and breaking again. In others the same result can be achieved by sinking the fixed platinum point deeper in its bed, by filing down the bed, so that the diminished cam can still separate the points. The important point is to ascertain if the points actually break or not. When that is done observation can detect the reason of their not breaking, and ingenuity can generally atone for wear, and compel them to break once more.

Next, supposing there is no spark, even though the platinums are making and breaking contact correctly, and its parts. brushes, etc., are all clean and unbroken. In this event the derangement is very likely to be a job for the makers, and its discovery may even be a matter of difficulty to them. It should be understood that such a misfortune is indescribably rare. As a last resort the entire magneto should be carefully dismantled, according to the directions in the maker's booklet, which are usually very full. If the derangement lie in the interior of the condenser or the armature, it will be beyond an amateur's capacity to either trace or remedy it. But very possibly a loose connection, a cracked insulator, a damaged brush, or a film of oil, dirt or water will be discerned by the eye, in any of which cases the remedy is obvious. If an armature connection be visibly broken, as may be the case with either of two external connections on several makes, the greatest care will be needed in remaking the connection. If the broken tag of wire be pulled about further trouble will be set up, and, as a rule, a piece of wire, no longer than an inch, will have to be very gingerly spliced in and covered with several wrappings of insulated tape.

#### II.—SIMPLE MISFIRING.

When the trouble merely consists of misfiring in one or more cylinders, even a duffer may quickly find and apply a remedy. First, discover the errant cylinder or cylinders; short circuiting the plug terminal onto the cylinder head by laying the blade of a wood handled screwdriver in contact with both, while the engine is running, is a simple expedient in the absence of a switchboard or switch plugs, or, if the high tension wires to the distributor have plug joints, each wire may be detached from the distributor in turn. On tracing the faulty cylinder, begin by taking out its plug, setting the points by a gauge, if to hand, or otherwise as close as they will go without actually touching; if necessary, clean the plug head thoroughly with a knife, petrol and brush. If this do not cure, change the plug. If this do not cure, the fault will be in the wire from the distributor, provided the misfiring came on suddenly and was pronounced in character. If the miss be gradual, irregular and only faintly discernible, the fault may lie in the segment of the distributor disc which supplies current to this particular cylinder. In this case attention is best postponed till a repair shop is reached, as probably the metal segment has worn, or the insulation round it has worn, and the whole will need refacing in a lathe; but it is worth while trying to clean this portion of the distributor with emery paper or rag, and, if any metallic particles are visibly embedded in the face of the circular vulcanite recess, to scrape them off, taking care not to seriously roughen the surface (else the wiper will begin to jump).

## III.—WEAK RUNNING AND GENERAL LOSS OF POWER.

Sometimes no actual miss and no absence of the sparks can be discovered, and yet the entire engine is sluggish and difficult to start, also falling away rapidly on hills, and calling for a lower gear than formerly under accustomed circumstances. Before tampering with the magneto every precaution must be taken to insure that the fault does not really lie in the valves, carburation, etc. Where a supplementary ignition is fitted this is easily tested, as the engine will behave properly on the accumulator system. When the fault is traced to the magneto, without any possible room for doubt, it is quite an inexpensive matter to return it to the makers. They will clean it, reface all brushes and contacts, renew all weakened springs, etc., for a few shillings. But if it be preferred to tackle the matter at home, wear and resistance are the two factors to be dealt with. Wear is to be looked for chiefly in the contact breaker (vide under I), and the springs here may have lost "set." Resistance will be found wherever dirt or oil or grease exist within the magneto, particularly beneath small screwed-on parts, such as insulating washers or along shafts, or beneath brushes, and also wherever a carbon brush has been allowed to wear hard and scaly on the tip. Demagnetization of the horseshoes should never occur under two or three years of running. This job, in any

case, entails the dismounting of the entire magneto, and whoever does the work must not forget to lay a piece of iron-a couple of spanners will serve-across the horseshoe if they are detached first, or between them if the armature is taken out before the horseshoes are dismounted. On the whole, it is probably advisable to return the machine to the makers in all cases of general debility, as they will then test the entire mechanism, remedy any unsuspected derangement in the condenser, etc., and return it absolutely as good as new. However, where economy is desired, the work can be done at home; the writer has run a magneto for nearly 50,000 miles without the makers ever seeing it, and it is now as efficient as when it first left their factory. —The Autocar.

#### Motoring and Linens.

Motoring, besides having revolutionized travel, bids fair to bring about important changes in the linen manufacturing industry. Flax fabrics are now being extensively utilized for making motor cloaks, overalls, costumes, etc. Besides being largely patronized by motorists for personal wear, linen cloths are popular as material for making detachable linings for the interior of automobiles, cushion covers, head rests, etc. The advantage of these detachable linings is that, after the dust and grime of a day's travelling, the covers can, with but little labor, be taken off and washed. and the car turned out next day cool, clean and comfortable looking. In the manufacture of motoring costumes, although colored materials enjoy a certain amount of patronage, the prime favorites are cream and natural shade cloths. The weight of material varies according to individual tastes, but there is a decided preference for light-weight with a close texture. The fact that linen can be woven so close in texture is one of the chief reasons why it stands unique as an article for making motoring garments. An essential is to get something wind and dust proof, and with a compactly made flax fabric this end is accomplished better than with any other textile, excepting, of course, material subjected to a waterproofing process. Another reason why linen cloth is growing in popularity with motorists is that overalls and such like garments can be slipped off and on in an easy way without disarranging one's attire. While thousands of pieces have already been shipped this year to the United States for making motor costumes, the new business arranged with manufacturers for spring trade for 1910 is of unusual dimensions. Most of the materials utilized have been of a plain texture, but there is a growing demand for a moderate priced twill cloth, which is said to be a better protection against wind, though if twill be too coarse it serves only to hold dust and dirt. However this may be, there is no doubt that manufacturers will be able to make materials that experience may from

time to time prove to be best adapted for whatever part of the world they are required.—The Autocar.

#### German Truck Wheels Standardized.

The German Automobile Manufacturers' Association, co-operating with the German War Department, has agreed upon standard sizes for motor truck wheels and tires. It will be remembered that the German War Department pays a substantial bonus to all purchasers of motor trucks of certain types which have been found suitable for military purposes and whose purchasers pledge themselves to hold the trucks in readiness for the use of the War Department. The standards referred to were agreed upon at a meeting held at Berlin on July 1. In future all 4 ton trucks will be equipped with wheels and tires of the following dimensions: Diameter of front wheel rims. 670 mm.; width of front tires, 120 mm.; diameter of rear wheel rims, 850 mm.; width of rear tires (double), 140 mm.; diameter of front wheels with tires, 830 mm.; diameter of rear wheels with tires, 1.030 mm. A uniform method of fastening the rubber tires to the rims, known as the "slot fastening," was unanimously adopted. The advantages to the War Department of standard wheels and tires on all of the motor trucks on which it pays a bonus are obvious. It is intended to also standardize other parts of the trucks.

#### Long Stroke Motors.

The recent Prince Henry Tour in Germany furnished numerous instances of the practice among manufacturers of increasing the proportion of the stroke to the bore. The rules of the contest did not favor the long stroke motor, as the horse power was calculated by means of a formula making it proportional to the square of the bore and the two-third power of the stroke, which is thought to be in very close accordance with the actual facts. It is believed that practically all of the competing cars were stock machines, so far as cylinder dimensions are concerned. Following are some examples of long stroke motors of more or less prominent make:

Name.	Millimetres.	Inches.
Fiat	118x190	4.72 <b>x7.</b> 6
Gobron-Brillie	. 112X200	4.48x8
Austrian Daimler	115×154	4.6 x6.16
Metallurgique	. 106x171	4.24×6.84
Presto	. 100x200	4 x8
Benz	. 110X150	4.4 x6
Opel	. 110X150	4.4 x6
South German	. 100X200	4 x8
Horch	. 85x170	3.40x6.80
Mercedes	. 90X140	3.60x5.60
Laurin & Klement	. 85x150	3.4 x6
Opel (winner)	. 70X125	2.8 x5

#### New Swedish Tariff.

The Swedish Parliament has at present under discussion a revised tariff schedule which will slightly affect the importation of automobile parts and accessories. The new schedule is a very comprehensive one, comprising no less than 1,281 headings. It

is the intention to apply a single or uniform duty instead of a differential duty, as is provided for by the new American tariff. In case any foreign country should legislate against the Swedish industry, it is the intention to retaliate by adding a certain percentage to the duties upon goods imported from that country. One of the changes in the new tariff, as compared with the old one, relates to motorcycles. These will hereafter be dutiable at 60 crowns apiece, instead of at 15 per cent. ad valorem, as formerly. As the average price of a motorcycle is about 400 crowns, there is really no appreciable change in the rate of duty. Parts of motorcycles not specially enumerated will be subject to a duty of 2 crowns per kilogram, the same as bicycle parts. Wagons and vehicles not specially enumerated, also such provided with motors, as well as running gears for same, and rubber tired wheels for such vehicles. are subject to a duty of 15 per cent. This heading covers automobiles, and the rate of duty on these vehicles remains, therefore, unchanged.

## New French Road Law in Preparation.

The French Minister of Public Works, Barthou, is making arrangements for the drafting of new road traffic laws, and an international congress for the purpose of unifying road rules has been called to be held in Paris on October 5 next. The first step taken by the minister was the appointment of a committee on investigation, which held its first meeting on June 17 at the office of the Minister of Public Works under the chairmanship of General Inspector Lethier of the Department of Road Building. The committee, which counts among its members several representatives of the Touring Club of France, the Automobile Club of France and the automobile press, decided to begin its work by collecting the traffic regulations in force in the different parts of France and to make a thorough study of these regulations.

#### Pressed Steel Flooring.

The latest use to which pressed steel has been put is as a pavement or floor covering. It can naturally be used only where special conditions obtain. The subject has been taken up by the Forges de Douai of France, which produce the Arbell pressed steel used on a majority of French automobiles. One of the courts at the Douai works has been laid with this paving material or covering, and it has also been applied as floor covering in front of boilers, etc. The upper surface of the sheet is provided with diamond shaped protuberances which serve the double purpose of retaining the sheet in place and making it non-slipping. After the sheet has come out of the press, and while it is still hot, it is quenched in coal tar or oil to protect it from rusting. The sheets which have been made so far are 5-32 inch thick and 51/2 inches square, weighing a little over 3 pounds each.

## The Sixth Annual A. A. A. Tour. (Continued from page 94.)

hour more sleep. Rest, if I may say so, is one of the most desired privileges on the tour. Late to bed and early to rise is the slogan of the tourists. Few of the cars on these 200 mile runs are able to get in much before half past three or four o'clock, and many do not reach the night control before six. As a result the tourists must stay up later, and yet we all have to get up just as early in the morning.

This morning the first car started at seven, as usual, but since the watches had been set back the sun was really much higher and so the trip was made more in the heat than any day before. To add to the discomfort of the passengers in the cars the route lead through alkali plains where the hot white, penetrating dust blistered the faces and parched the lips of the travelers. As far as Fort Morgan conditions were worse than the day before, but they were not to be compared with what were met with beyond there and almost up to Denver.

After leaving Julesburg, 20 miles of good roads gave the tourists good opportunity for speeding, but these were followed by another 20 miles of newly made roads which were so rough that more than one passenger lost his patience. On this rough stretch a ford was met, the first on the tour so far, which came near stalling many of the cars., The ascent out of it was so badly cut up that the axles and pans scraped if the car got into the ruts. The writer saw the Mason, No. 112, stalled at this point. With the crews of Cars No. 1, 53, 5 and 106 to help and a good rope the car was quickly extricated. This taught the drivers a good lesson, viz., that it was bad policy to get into the ruts another fellow had made. The writer at this point observed one of the cars with both front wheels off of the ground, only the front axle holding the car. When the power was applied the car must have been pushed fully a yard while riding on the axle.

After leaving Sterling, 61.9 miles, comparatively good roads were had all the way to Fort Morgan, 112.7 miles. They were only of dirt but they were well worked and kept in fine condition. Beyond Fort Morgan the contestants first had a taste of real prairie, and few seemed to enjoy it. The 60 miles from Fort Morgan to Bennett were almost without a house. In several places it was a matter of 15 or 20 miles between houses. In addition there was not a single tree or protection from the blazing sun for the whole distance. The roads were nothing more than cow paths where there were any at all; elsewhere the confetti was our only guide. In one or two places the cars lost their way.

At one point on this trip across the prairie a bridge had to be crossed which was abominable. The approach and descent were about a foot above the ground and the whole structure was so flimsy that it is a wonder that only one car came to

grief in crossing. The Thomas press car broke through one side of the floor planking and when the following cars arrived they found hardly more than 3 inches to spare on each side of the wheels. To get the cars up onto this place, over a foot high, and not drop into this hole taxed the drivers' skill to the utmost. Besides, after each car passed it was necessary to rebuild the floor.

Several of the cars which attempted to follow in the wheel tracks along the prairie roads were nicely hung up on their rear axles and had to fill up the ruts with clay and dirt, as no stones could be found. The axles were then jacked up and the cars driven out. Some of the cars did not carry shovels or rope, and they had a bad time of it. Most of the contesting cars are carrying shovels, rope and block and tackle.

The prairie dogs which Dai H. Lewis has been promising us for some time were seen for the first time during the afternoon. All the way across the 60 mile stretch they were constantly in evidence. Also sage brush and cacti were everywhere that the eye turned.

#### STRAIN ON THE DRIVERS.

Only one car will receive a penalty of any importance today, this being the Glide, No. 10, driven by A. Y. Bartholomew. Tire troubles were few also, there being only four cases. It seems that the drivers and passengers are put to a harder test than the cars. The long hours, the excessive heat, the want of water and the treacherous condition of the roads are beginning to have their effect on them. Three days of over 200 miles' driving under such conditions comes near being the limit of human endurance, especially when the runs are under a schedule time.

Many parched and bleeding lips were to be seen on every arrival, caused by the alkali dust. To protect themselves the majority of the tourists had handkerchiefs tied across their noses and mouths. Many also provided themselves with sunbonnets to keep the sun off their faces.

#### LESSONS TAUGHT.

So far the run has been a revelation to the Easterners who have never been in the West before, and indeed also to those who have only seen it from the windows of a Pullman car. Many have expressed their surprise at the richness of the country, and the opportunity which it offers for the automobile manufacturer. This is especially the opinion of H. O. Smith, president of the Premier Company, and also Howard Marmon, of the company bearing his name. The people all along the route of the tour seem to think that there must be some obscure reason why this or that car is not on the tour. "Are they afraid of our roads?" This is one of the questions often asked. On the other hand, everyone seems to have the idea that any car which goes on this tour is all right. To appreciate this sentiment it is necessary to be with the contestants, and get in close touch with the people, so Mr. Smith said.

The Thomas No. 10 had its perfect score spoiled today when it was necessary to repair the gasoline feed pipe. Ten minutes were required to do this, and a penalty of one point was assessed.

The Glide No. 10 was late arriving, at 7:45 in the evening. The trouble was the breakage of a spring, which had to be replaced. The tardiness was 128 minutes, which will probably eliminate the chances of this car as far as winning the trophy is concerned. Mr. Bartholomew also had fan belt trouble. This makes the seventh car with fan belt trouble.

No. 105, Chalmers, driven by Jas. Machesky, shored off the magneto drive pin, and will have to continue the run with battery ignition alone.

It is also reported that the Marmon No. 5 had some trouble with the fan belt, and may receive some penalty for it.

Today saw another clean score tire record spoiled, for the Mason No. 112 had its first puncture. The only cars remaining with a perfect record in this respect are Nos. 9, 52, 53, 102 and 107. Nos. 9 and 102 have Goodrich tires, 52 and 53 have Diamonds, and 107 has Ajax.

#### ARRIVAL AT DENVER.

Scarcely had we checked in at Denver than the members of the Denver Motor Club took us to their clubhouse, which is located only a few steps from the parking enclosure, and did everything in their power to refresh the inner man. Refreshments of the sort that remove the alkali dust from the throat were served, and up to a late hour last night the tourists were still gargling their throats.

The Denver Athletic Club also opened their clubhouse to the visitors, and many took advantage of the swimming pool which it offered.

#### PROGRAM OF FESTIVITIES IN DENVER.

July 25.—10:30—Meet at the Denver Motor Club for an automobile ride over the city and suburbs, returning to the club for a buffet luncheon. 3:30—Special street cars for Lakeside, where a young couple married on the spot will start on their honeymoon in a balloon. Vaudeville and all concessions to be visited. 6:30—Banquet to the tourists.

Monday, July 26.—8:30—Special train on the Colorado and Southern over the famous Georgetown loop, and to the top of Mount McClellan. A special lunch car will accompany the train. 6:30—Open house at the Denver Motor Club; entirely informal.

THE SCORE AT DENVER.

	THE DOORE AT DESCER.	
	GLIDDEN TROPHY.	Penalty
No.	. Car. Driver.	Points.
1	PremierWebb Jay	n
2	PremierH. Hammond	0
*3	ChalmersWilliam Bolger	1221.4
4	MarmonF. E. Wing	6.8
5	MarmonH. C. Marmon	20
6	MaxwellE. G. Gager	0
7	JewellO. P. Bernhardt	8.2
8	PierceF. S. Day	0
9	PierceW. Winchester	0
10	GlideA. G. Bartholomew.	1.6
11	Thomas	6
12	MidlandE. O. Hayes	4.3
14	WhiteH. W. Searles	0

#### DETROIT TROPHY.

Penalty

No.       Car.       Driver.         51       Simplex	
HOWER TROPHY.	
·	Penalty
No. Car. Driver.	Points.
100 MolineC. H. Vandervoort	3.1
100 MolineC. H. Vandervoort 101 MolineJ. A. Wickie	
	o

109	rierce	Snoneid	· ·
110	McIntyreF.	Godwin	1452.7
	Jewell0.		
112	MasonF.	S. Dusenberg	4.8
114	LexingtonJ.	C. Morris	4.3

\*104 Brush ......D. B. Huss...... 2251.6

105 Chalmers .....J. MacHesky ..... 0 106 Hupmobile ....F. Steinman ..... 1358.0

107 Maxwell ......C. E. Goldthwaite...

108 Pierce .....J. S. Williams.....

- \* Withdrawal from competition,
- † Not complete.

## Chicago Meeting of Automobile Engineers.

Headquarters for the Chicago meeting of the Society of Automobile Engineers will be at the Illinois Athletic Club, 145 Michigan avenue. This is a private club, and it therefore becomes necessary for all those attending the meeting to become guests of one of the Chicago members, who is also a member of the club. F. J. Newman is in charge of the arrangements.

## Fairview Motor Company to Make Trucks.

There have recently been repeated signs of increasing activity in the commercial vehicle branch of the industry. In the last two issues we reported plans of extension of two commercial vehicle concerns located in Michigan, and as we go to press our Detroit representative telegraphs that a new company has just been organized there to manufacture commercial vehicles exclusively. The concern is to be known as the Fairview Motor Company, and is backed by the men who are in control of the Chalmers-Detroit Motor Company.

#### New Kinsey Company Organized.

The Kinsey Manufacturing Company, of Toledo. Ohio, which was incorporated recently, held a meeting at its office on last Wednesday, and elected the following officers: Isaac Kinsey, president and general manager: John N. Wilson, vice president and treasurer, and Homer V. Hawk, secretary. The old Kinsey Manufacturing Company was located in Dayton, Ohio, where it manufactured frames, radiators, oilers, etc. Some months ago the company sold its plant to the Dayton Motor Car Company, and removed to Toledo, where it occupied part of the former Pope Motor Car Company's plant. The new firm will engage extensively in the manufacture of automobile parts.

## Muncie Motor Truck Company Organized.

The Muncie Motor Truck Company has been organized at Muncie, Ind., and will establish a factory either in Muncie or Yorktown for making motor trucks. Interested in the company are D. O. Skillen, glass manufacturer, of Yorktown; Thomas L. and Hugh Warner, automobile parts manufacturers, of Muncie, and Milton E. Ailes, vice president of the Riggs National Bank, of Washington, D. C.

#### lowa Dealers Organize.

Dealers from all parts of Iowa met at Marshalltown on July 12, and organized the Iowa Automobile Dealers' Association. The following officers were elected: D. P. McClure, Oskaloosa, president; W. E. Sears, Des Moines, first vice president; M. J. Dannatt, Clinton, second vice president; C. C. Eldridge. Marshalltown, secretary and treasurer.

One of the grievances of the Iowa dealers is the delay in deliveries from factories and jobbers. The demand for automobiles this year has been so great that many dealers have been obliged to wait much longer for their cars than they had expected, and this, of course, entails many annoyances to them. The Marshalltown A. C., which recently promoted the organization of a State A. A., co-operated with the local dealers in entertaining the visitors. One of the features of the meeting was an automobile parade through the main streets of the city.

Another meeting will be held in Clinton at an early date. A constitution and by-laws will be adopted, and the association will incorporate. It is planned to establish a rule to allow members to sell cars outside their territory, on the condition that they turn over one half of the commission to the agent in that territory.

#### Final Report on Pope Manufacturing Company.

Counsel for receivers of the Pope Manfacturing Company has filed their final report, according to which, after paying all claims in full, with interest, there remain sufficient assets to pay a dividend of 41.277 per cent. on \$2,391,000 of first preferred stock. Vice Chancellor Howell, to whom the report was presented, has signed an order directing persons in interest to show cause next Monday why the report should not be confirmed and the receivers discharged upon the making of final distribution.

#### Trade Personals.

Mr. Derose, formerly of Aurora, Ill., has taken charge of the selling end for the Gary Motor Car Co., Muskegon, Mich.

Berry Rockwell, late of the Railway Steel Spring Co., has accepted the position of advertising manager of the Maxwell-Briscoe Motor Co.

J. B. Chapman has resigned as treasurer and general manager of the Belmont Garage Co., Washington, D. C., and has been succeeded by R. W. Nichols.

Tyrus Cobb, of Macon, Ga., has been appointed State manager for a Detroit automobile manufacturer, and will be in control of agencies at Atlanta, Savannah and two other Georgia cities.

A. L. Bolster has been appointed manager of the Philadelphia Fisk tire branch, which is located at 258 North Broad street. He succeeds K. B. Harwood, who becomes special outside factory representative of the Fisk Co.

E. Mack Morris, manager of the Model Automobile Co., Peru, Ind., was in New York recently establishing an Eastern agency for the company's Great Western cars. We are informed that Mr. Morris secured contracts for 725 cars while here.

David H. De Armond, Hamilton, Ohio, has bought the interest of Harry J. Stead in the Hamilton Automobile Co. Mr. De Armond's brother, W. R., will be the business manager of the garage in the future. The company handles the Maxwell and Overland cars.

W. N. Hellen, formerly with the Bergers Automobile Co., Omaha, Neb., has assumed the retail managership of the Velie Motor Car Co. branch in Omaha, which has recently moved to new quarters at Nineteenth and Farnam streets. Mr. Hellen will also handle the Columbus electric car.

Benj. H. Ooley has been appointed manager of the Dayton, Ohio, distributing branch for Chalmers-Detroit cars. Mr. Ooley has established a temporary office at 1004 Conover Building, but will shortly move into a salesroom in the new Bimm Building, corner of Main and First streets.

Ernest Coler has assumed charge of the Maxwell-Briscoe Motor Co.'s new publishing department. Mr. Coler, who has looked after the Maxwell's publicity for the past two years, will continue to pulish the Co-operator, and will also be responsible for most Maxwell literature.

Edwin E. Peake, of Detroit, Mich., has been appointed manager of the Regal Motor Sales Co., 758-60 Woodward avenue. The Sales Co. controls the sales of Regal cars throughout the State of Michigan. Mr. Peake was formerly connected with the sales department of the Detroit Buick branch.

#### New Incorporations.

Adams Garage Co., Trenton, N. J.—Capital stock, \$25,000.

Universal Auto Co., East Orange, N. J.—Capital stock, \$50,000. To manufacture automobiles. Colorado Auto-Lite Co., Denver, Col.—Capital stock, \$800. Incorporators, W. J. Peete, John E. Fry and J. W. Foster.

Oldberg Manufacturing Co., Detroit, Mich.— Capital stock, \$10,000. Incorporators, V. Oldberg, H. P. Wayman and A. C. Born.

Emergency Automobile Tire Co., South Bend, Ind.—Capital stock, \$25,000. Incorporators, Chas. M. Culp, Alfred J. Kroencke and Geo. C. Fish.

The Garlock Auto Specialty Co., Palmyra, N. Y. —Capital stock, \$10,000. Incorporators, Olin J. Garlock, Herman E. Whiting and Sanford D. Van Alstyne.

The Albany & Berne Auto Co., Albany, N. Y.—Capital stock, \$20,000. Incorporators, Frank Tompkins, White Plains; Henry Binns, W. T. Cheseboro, of Berne; T. N. Renny, of New York, and R. D. Fowler, of Singerlands.

#### New Agencies.

Atlanta, Ga.—Georgia Motor Car Co. Columbus, Ohio.—A. J. Pray, Studebaker. Heppinger, N. D. -A. R. Castle, Overland, Louisville, Ky.—George Looms, Locomobile. Grand Rapids, Mich.—M. L. Hughes, R. & L. St. Louis, Mo.—The Park Automobile Co., Hud-

Portland, Me.—Harmon Automobile Co., Hud-

Houston, Tex.—Cotton & Dupuy, Babcock electric.

St. Louis, Mo.—Brenton G. Van Cleave, Speed-

Milwaukee, Wis.—Edgar F. Sanger Co., Oldsmobile.

Salt Lake City, Utah.—Botterill Automobile Co., Hudson.

#### MINOR MENTION



The Imperial Automobile Company, Jackson, Mich., are to bring out two models.

The Fuller Buggy Company, Jackson, Mich., will put out a pneumatic tired machine this fall.

E. D. Carlough, Paterson, N. J., who has secured the State agency for the Autocar for 1910, will shortly open a branch in Newark.

The Badger Automobile Company, of Columbus, Wis., has purchased a tract of 20 acres in the city of Columbus, and will begin the erection of shops at once.

R. E. Smith plans to establish an automobile supply store in Sherman, Tex., and would like to hear from manufacturers and jobbers wishing to be represented there.

The Auto-Bug Company, of Norwalk, Ohio, has recently completed a new model, known as Model E, a five passenger, two cylinder, 22-24 horse power car.

The Auto Go-Cart Company, of Beloit, Wis., will shortly remove to Monroe, Wis., and increase its capital from \$25,000 to \$50.000. The company is being promoted by Sam Kneller and Fred Koplain.

The hill climb which was to be held at Richfield Springs, N. Y., on July 31, has been postponed until August 7, on account of interference of the date with that of the Brighton Beach twenty-four hour race.

The American Motor Car Sales Company's Eastern office has been moved to 1776 Broadway, New York. The office is in charge of Thomas Forbes, and American and Pope-Toledo cars are sold from it.

Thomas B. Jeffery & Co. inform us that up to June 1, 1909, 7,383 cars had been registered in Wisconsin. of which, the largest number of a single make, 733 were Ramblers. This make, they say, also leads in Illinois.

For the month ending July 15, \$21,129 was collected by the Motor Vehicle Department of Ohio as fees for 1,775 registrations by owners and twenty-five by manufacturers. The total receipts from the registration of automobiles and licensing of operators for the year ending June 10 was \$120,101.23.

The Kansas City Chauffeurs' Club, which has its headquarters at 1735-37 Grand avenue, and boasts of a membership of more than 100, has arranged for weekly lectures by local dealers and others. The first lecture was given on July 22 by Chas. V. Fyke, local representative for the Locomobile.

The Licensed Chauffeurs' Protective Association of the City of New York was incorporated last week by Mathew J. Gonnoud. 1595 Lexington avenue; Frederick Walter, 1600 Lexington avenue, and Isador Klatzke, 133 East 104th street. One of the objects of the organization is to furnish bondsmen for members who may be arrest-

ed in the lawful pursuit of their calling, and counsel to defend accused members without cost.

The Buffalo Carburetor Company, Detroit, Mich., are breaking ground for a foundry, which will be one of the best in the State.

An automobile mart, consisting of a six or seven story fireproof building, is to be erected in Newark, N. J., somewhere near the centre of the city. The building is to be let exclusively to dealers in automobiles and accessories.

The Perry Tire Protective Company, of Lansing, Mich., has been bought by the Union Steel Spring Company, of Albion, Mich., and will be removed to the latter city. The Perry tire protector is a chain anti-skidding device.

A convention of branch managers of the Ajax-Grieb Rubber Company will be held at the factory of the company in Trenton, N. J., July 28-31. A number of the Western branch managers are now en route to the East to attend the convention.

A Minneapolis inventor has applied for a patent on a new double inner tube. It comprises two separate chambers formed by a partition, with a valve opening into each, so that either chamber can be used. If one chamber is punctured the other one is inflated.

The Grabowsky Power Wagon Company, of Detroit, Mich., have recently sold the remainder of their treasury stock, and all of the \$300,000 stock has now been placed. The money obtained from the recent sale will be used for the erection of an additional factory building.

The Indiana Automobile Parts Company has been organized at Marion, Ind., by Geo. R. Stewart, president of the Indiana Brass and Bronze Company, and several others. The new company will absorb the Indiana Brass and Bronze Company, and will manufacture a line of automobile parts.

John F. Baker, trustee of the bankrupt estate of Thos. D. Buick, Flint, Mich., has made application to the courts to sell the remainder of the assets at public auction in the store of the bankrupt on July 31 at 10 a. m. A hearing will be given to creditors on this matter at the office of Wm. R. Franklin, Flint, Mich., one hour before the time set for the sale.

The George H. Gibson Company, Tribune Building. New York city, has taken the American agency for the *Technical Index*, a monthly paper published in Brussels, Belgium, giving a systematic descriptive record of all original articles appearing in over 200 engineering and technical journals and reviews, and indexing the proceedings of technical societies.

The Wordingham Manufacturing Company has been incorporated, with a capital stock of \$50,000, to manufacture a foot horn and other accessories and specialties for motor cars. The incorporators are W. G. Wordingham, Phil Kennedy and W. R. Greenlaw. The foot horn is the invention of Mr. Wordingham, and was exhibited at

the Milwaukee show last March. Quarters have been leased, but it is planned to eventually build a factory.

The Universal Motor Company, of Denver, Col., which has brought out a combination gasoline-electric vehicle system, is trying to interest Lansing, Mich., capitalists in a factory for the manufacture of trucks under this system in that city. Each wheel of the truck is provided with an electric motor, and the current is furnished by a gasoline engine driven generator carried on the vehicle.

#### Club Notes.

The Ontario Motor League has had prepared a summary of the motor vehicle laws in effect in the different sections of the Dominion of Canada.

The Cincinnati A. C., whose constitution limits the active membership to 500, now has reached that mark, and plans to amend its constitution to remove the limit.

The Cloud County (Kan.) A. C. is being organized by L. F. Davidson, and will probably have its headquarters at Concordia. It is planned to hold a number of road contests during the season.

The Duluth (Minn.) Automobile Club is to be reorganized, and a meeting for the purpose was held at the Commercial Club on July 15. The old officers of the club have resigned, and new ones are to be elected.

The Augusta (Ga.) A. C. has adopted resolutions protesting against an automobile tax bill, which is to be introduced in the State Legislature during the next few days. A copy of the resolutions was sent to Senator W. S. Morris.

The Winnipeg (Man.) A. C. is arranging for an automobile tour from that city to Minneapolis, Minn. a distance of over 1.500 miles. The tour will pass through Moose-jaw (Sask.), Devil's Lake, N. Dak.; Jamestown, Fargo, Detroit Lakes and Grand Forks.

The Floyd County (Ga.) Automobile Association was organized at Rome on July 16, with twenty-six charter members. The following officers were elected: A. N. Tumlin, president; Fred Hanson and Wm. De-Lay, vice presidents; W. B. Shaw, secretary and treasurer.

The Peninsula Automobile Association was organized with thirty-nine charter members at Newport News, Va., the past week. The following officers were elected: W. A. Post, president; L. B. Manville, vice president; W. L. Cooke, secretary-treasurer, and E. B. Dennie, assistant secretary-treasurer.

The Milwaukee Automobile Club will meet in special session on Thursday night, July 20, to make a final decision in the matter of building a clubhouse. There has been some difficulty in obtaining an expression of sentiment as to the advisability of mortgaging the club's present properties to cover the cost of a building, but proxies will be legal at this meeting, and the vote will be

final. The club owns a 5 acre tract at Blue Mound and Cottrill avenues, west of Milwaukee, and will have one of the finest club properties in the West if the vote is in favor of building, which is wholly probable. The clubhouse would cost \$12,000.

Garage Notes.

The Beatrice (Neb.) Automobile Co. has let contracts for a \$5,000 brick garage on Fourth street.

J. C. Blackburn, Omaha, Neb., recently completed a new garage and implement building, 26x140 feet.

The Utica Automobile Co., Utica, Neb., have begun work on a new store building, 16x32 feet, near their garage.

The Ashtabula Garage has been opened at 44 Centre street, Ashtabula, Ohio, with George H. Holmes as manager.

Work has been begun on the garage of J. H. Donner, of Aurora, Neb. The building will be 40x60 feet, of brick veneer.

The C. A. Shaler Co., of Waupun, Wis., who manufacture the Shaler vulcanizer, is handling the Elmore line in Wisconsin.

The Minneapolis branch of the Studebaker Automobile Co. has decided upon a site at Sixth street and Second avenue for its seven story warehouse.

The Bruening Brothers Automobile Co., Kansas City, Mo., have removed their garage to their new building on Armour and Broadway boulevard

A building on Jefferson avenue, Detroit, near Woodward avenue, is being remodeled for the Cunningham Auto Co. The new company will sell E-M-F and Studebarker cars.

The Central Garage has been opened in Flint, Mich., in the Watson Block, corner South Saginaw and East Court streets. A specialty will be made of repair work. J. W. Barton is proprietor.

V. S. Darling, Auburn, Me., has leased the store in the new National Shoe and Leather Bank Building, in which he will conduct his supply business and agency for the Maxwell and Rec cars.

Dr. H. A. Lawton, Cleveland, Ohio, has taken the local agency for the Waverley Automobile Co., and has taken space at the garage of the Elmore Motor Car Co. at East Nineteenth street and Euclid avenue.

The Reliance Automobile Co., of San Francisco, Cal., has recently moved to its new sales-room on Van Ness avenue. The shop and garage of the company will remain at the old location in Fulton street.

The Central Motor Car Co., Oklahoma City, Okla., are fitting up a repair shop in the Crowder Building on California avenue, and are negotiating for a new 50x140 feet building for a storage and salesroom.

The Western Automobile Co., of St. Louis, Mo., has taken a ninety-nine year lease on a property at the corner of Washington avenue, Olive street and Walton avenue. The company will erect a modern garage on the site, provided a bill now pending in the Legislature is passed.

Herman Schnure, secretary and manager of the Van Automobile Co., St. Louis, Mo., has resigned from that company, and will open a new business at 1131 Olive street about Apgust 1. Mr. Schnure recently returned from Detroit, where, it is understood, he secured a number of agency contracts.

W. A. Voigt and Albert Maurer, of Sheboygan, Wis., and Fred C. Voight, of Milwaukee, Wis., have purchased a building site at 816 Niagara avenue, Sheboygan, and will erect a large garage. Plans are for a two story, reinforced concrete building, 60x100 feet in size. The location is in the centre of the business district, near the largest hotel in the city. The repair department will occupy part of the first floor and the basement.

The Cubbins Automobile Co., Mcmphis, Tenn., composed of John F. Cubbins and Malcolm M. McCallum, has leased a building at 187 Court avenue, which it will fit up as a salesroom. The company has taken the agency for the Brush

runabout, and expects to take on several other lines.

The United Motor Co., Wichita, Kan., has moved from 115-119 East Second street to its new store at 114 North Emporia avenue.

C. E. Cain & Son, of Waupaca, Wis., have opened their new garage and machine shop, and are also handling accessories and specialties.

Thieves broke into the garage of D. F. Maltby at Glen Cove, L. I., on the morning of July 25, and stole tire covers, tools, etc., valued at \$700.

The Buick Motor Co., New York branch, is now occupying the entire building at Broadway and Sixty-fifth street, which it formerly divided with the Lozier Motor Co. and the Auto Supply Co.

The B. L. Huffman Automobile Co., Omaha, Neb., have moved from Nineteenth and Farnam streets to the former quarters of the Coit Automobile Co. at 2025 Farnam street, The Huffman Co. handles the Interstate and Hupmobile.

A building is being erected on the north side of Farnam street, Omaha, Neb., for use by the Electric Garage Co. It has a frontage of 66 feet and a depth of 125 feet. Three lines of electrics will be handled, viz., the Baker, the Rauch & Lang and the Detroit.

and the Detroit.

The Fred J. Titus Automobile Co., now located at 213 Clinton avenue, Newark, N. J., will shortly move to a new building on Branford place, corner of Halsey street. The company now handles the Herreshoff and Houpt cars, and will add the Palmer & Singer line.

A plan is on foot in Mount Pleasant, Ia., to organize a garage company on the co-operative plan. It is the intention to incorporate the company, and to elect a board of directors, who will then elect a manager. A meeting for the purpose of organizing was held at the office of Chas. A. Gregg on July 13.

A three story building is being ereceted for the Baker Electric Vehicle Co. on a 50x162 feet plot at 2313-15 Michigan avenue, Chicago, Ill. The building has been leased for ten years by the Baker Company at 5 per cent. on \$55,000 for the land, and 8 per cent. on the cost of the building, which is estimated at \$30,000.

The private garage of P. Welch at 321 Eighth avenue, Spokane, Wash., was destroyed by fire on July 2, and two automobiles, two carriages and sundry equipment were also wrecked. The total loss is estimated at \$15,000, of which little is covered by insurance. It is believed that the fire was caused by short circuiting of the electric wires.

Glenn Frazell, of Springfield, Mass., has recently purchased the old skating rink in that city, which he has remodeled and fitted up as an up to date garage, and opened as the Springfield Garage. The building is located at the corner of Limestone and Mulberry streets. Mr. Frazell has secured the agency for the Studebaker and E-M-F

The E. W. Robbins Automobile Co. has been organized at Owosso, Mich., to conduct the garage now operated by W. H. Rust on South Washington street. The new company consists of J. H., B. P. and E. W. Robbins. The latter, who will have the active management of the business, up to a year ago handled the Jackson car in Los Angeles, Col.

Chas. E. Riess, of the Overland Motor Car Co. of New Jersey, has secured in addition to the New Jersey territory the Overland agency in New York for 1910. Mr. Riess will maintain a salesroom at Broadway and Fifty-seventh street, which he will manage himself, while the East Orange and Newark branches will be in charge of George Riess.

The Coit Automobile Co. and the Guy L. Smith Automobile Co., of Omaha, Neb., have recently moved into a new building on Farnam street, near Twenty-third. The building has a frontage of 72 feet and extends back 166 feet. The Smith Co. will have 48 feet frontage and the Coit Co. the remainder. The former handles the Peerless and Franklin and the latter the Rambler and Mitchell.

The Jamestown (N. Y.) Garage Co. has been reorganized. Morris Rosenbloom, a Rochester jeweler, has become president, and Benj. L. Arn-

son, of Jamestown, secretary and treasurer. The company's garage on West Second and Cherry streets will be thoroughly modernized, and a number of different makes of cars will be handled. John Down will be general manager, and Samuel Robbins, assistant manager.

A branch salesroom for Cadillac cars has been opened in Newark, N. J., at 226 Halsey street, in charge of Clarence E. Fisher, who was formerly sales agent for the Motor Car Co. of New Jersey, which formerly held the Cadillac agency. It is understood that the Detroit Cadillac Motor Car Co., which controls the branch, plans to erect a new garage and salesroom at an early date, but no site has as yet been selected.

The Nebraska Buick Motor Co. is being organized in Omaha to handle the Buick line in that State. The Bergers Automobile Co., which now handles the Buick, will confine itself to the E-M-F. after July 31. The incorporators of the new firm are: R. H. Collins, who is now general manager of the Buick agency at Kansas City; Chas. Stewart, of Madison, Neb., and J. H. Sidles, of the Sidles Automobile Co., of Lincoln. Neb.

A. A. Auble, Jr., and Fred Wood, proprietors of the Akron (Ohio) Auto Garage, have purchased the Cleveland branch of the Olds Motor Works, and will hereafter control the sales of Oldsmobile and Oakland cars throughout the State of Ohio. The new company, which will operate a salesroom at 1926 Euclid avenue and a repair shop in East Twelfth street, Cleveland, is to be known as the Olds-Oakland Co. The business in Akron will be continued.

#### Trade Literature Received.

The Simms Manufacturing Co., Ltd., London, Eng.—Catalogue of Simms motors.

The Fisk Rubber Co., Chicopee Falls, Mass.—Booklet relating to Fisk removable rims.

The Dow Rim Co., 1783 Broadway, New York.

—Catalogue of the Dow remountable rim.

Lavalette & Co., 112-114 West Forty-second Street, New York City.—Circulars regarding the Fisemann high tension magneto system.

Gray Brothers, 1111-1115 West Eleventh Street, Cleveland, Ohio.—Net price catalogue of motor car supplies.

Avery Co., Peoria, Ill.—"The Avery Farm and City Tractor."

Peerless Motor Car Co., Quincy Avenue and East Ninety-third Street, Cleveland, Ohio.—Advance catalogue of Peerless 1910 cars.

Hoyt Electrical Instrument Works, Penacook,

Hoyt Electrical Instrument Works. Penacook, N. H.—Circular describing the Hoyt Tribune voltammeter and its use for testing coils and batteries.

The White Co. Touring Bureau. 1402 Broadway. New York City.—White Route Book, No. 8, describing a route from New York city to Atlanta. Ga.

Apple Electric Co., Dayton, Ohio.—Circular describing the "Apleo" electric lighting system for automobiles.

II. H. Franklin Manufacturing Co., Syracuse, N. Y.—The Franklin Tourist Book. A book intended to help owners of Franklin cars wishing to start on a tour.

Builders Iron Foundry, 9 Codding Street, Providence, R. I.—Reprint from the Journal of the American Society of Mechanical Engineers of a paper on the Kenerson transmission dynamometer.

Detroit Wire Spring Co., Twenty-first and Standish Streets, Detroit, Mich.—Catalogue of Reliance cushion springs, Royal Arch cushion springs, New Departure cushion springs and Plain Construction cushion springs.

#### Front Springs.

Front springs, to preserve proper resiliency, should not be thicker than their width; should be fairly stiff, with a maximum deflection of not over one-quarter of an inch per hundred pounds; not off centred; and have the front eye set higher than the rear eye, not less than one-half inch, this latter preventing the car from ducking, says a bulletin of the A. L. A. M.

# The Horseless Age

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#### Calibrated Carburetors.

BY FRANK H. BALL AND FRED O. BALL.

Something more than a year ago an il-Justrated article appeared in THE Horse-LESS AGE, describing a series of carburetor tests in which the performance of several types of carburetors was graphi-cally shown. These diagrams represented the explosive value of the mixture under various conditions as indicated either by the pressure developed in an enclosed chamber or by the power obtained by its use in an engine in the usual manner. These tests furnished much valuable information, but they did not cover every phase of the subject as fully as might have been desired. For instance, no information was given as to the throttling resistance at full power, which is an important matter when comparing carburetor performance. Neither was the information very definite regarding the practical limits in the matter of minimum engine speed. This could not well have been otherwise, because the only definite and reasonable basis of comparison is in regard to the minimum quantity of air per minute that can be probably enriched. Because of these unanswered questions, it was thought best to take up the subject again on a more comprehensive plan. To do this a testing outfit was developed which consists of the following elements:

#### TESTING OUTFIT.

First.—An air exhausting outfit was constructed and arranged to draw air through a carburetor in any desired quantity up to the maximum capacity of the carburetor to be tested, and to do this against a choking resistance in the carburetor considerably in excess of what would be permissible in practice.

Second.—An air metering equipment was provided having a capacity greater than that of the largest carburetor to be tested, and arranged to meter with great accuracy the volume of air used under all conditions.

Third.—A water column gauge was connected to the mixing chamber of the carburetor just below the throttle, where the air and gasoline meet, and with this gauge the choking or throttling resistance of the carburetor could be noted at all times.

Fourth.—A calibrated measuring outfit was attached to the gasoline supply and arranged to measure very accurately the gasoline used by the carburetor.

With intelligent use of this equipment every important question regarding the performance of a carburetor may be answered. The measuring of the air and gasoline under all conditions shows exactly the quality of the mixture throughout the entire range of operation, and the readings of the water column gauge show the throttling resistance at all times. The practical working of this outfit in the investigation of a carburetor is shown in the diagrams that follow, each of which is a condensed summary of all the measurements obtained in a complete test.

#### BASIS OF COMPARISON.

Inasmuch as the several types of carburetors which produce these diagrams were of the same nominal capacity, it is convenient to make the comparison on the basis of the number of cubic feet of air per minute. It has been assumed in every case that 120 cubic feet of air per minute is the full capacity of a 11/2 inch carburetor; therefore the range of comparison is between 120 feet per minute and the smallest amount of air that can be properly enriched as indicated by the scale at the bottom of the charts. The vertical scale shows the number of ounces of gasoline per hundred cubic feet of air at each point of the full range of capacity. The volume of air per minute is indicated by the horizontal scale. The gasoline curve is therefore a gauge of the quality of the mixture throughout the whole range of capacity.

CARBURETOR WITH AUTOMATIC SUPPLEMENT-ARY AIR VALVE.

Fig. 1 is a complete showing of the performance of a well known carburetor of the conventional type in which the supplemental air supply is controlled by a spring opposed valve.

To understand the diagram it is necessary to keep in mind that about 5 ounces of gasoline per hundred cubic feet of air is the best mixture. It must also be remembered that the margin below 5 ounces of gasoline is very small, but that a very great excess of gasoline may pass through the engine without making the explosions cease, so that when a carburetor does not furnish a mixture of uniform quality it always means that the inequalities are in the nature of floods of gasoline under some conditions that heat and foul the engine and detract from its power.

Referring to Fig 1, it will be seen that the minimum quantity of air that can be enriched so as to be an explosive mixture is about 10 feet per minute, so that the total range of this carburetor is about 12 to 1 (assuming 120 feet per minute to be the uniform maximum for the proposed comparison of the several types).

It will also be noted that the throttling resistance at 120 feet is 23 inches of water.

In considering the quality of the mixture it will be noticed that, beginning with the smallest quantity of air that can be properly enriched, and progressing toward the full capacity, the supply of gasoline first becomes too great, the excess amounting to 56 per cent. at the maximum, and gradually decreasing as the volume of air increases until a normal mixture is reached at about the full capacity. This is a characteristic diagram of this type of carburetor, although the degree of error varies in different cases. It might be said, however, that

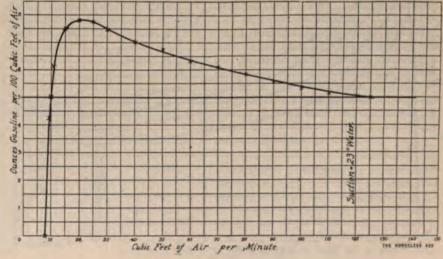


Fig. I.

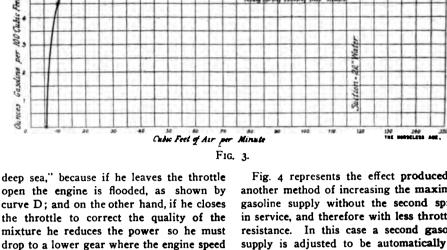
this is not an exaggerated case by any means.

To correct this apparently inherent error of performance various devices have been applied as supplemental attachments.

One method is to provide a mechanical connection between the throttle lever and the needle valve by which the quality of the mixture is changed by the movement of the throttle.

### CARBURETOR WITH INTERCONNECTED THROTTLE AND GASOLINE VALVES.

Fig. 2 is a diagram produced by a carburetor of the type just described. In this case a relatively weak spring is used on the air valve, and the mechanical movement of the needle valve is depended on to get the necessary gasoline for full capacity. The mechanical control attachment is therefore for the purpose of making it possible to use this weak spring, and thus keep down the throttling resistance. The several curves, A, B, C, D, show the gasoline supply per 100 cubic feet of air, with the throttle lever standing in four different positions. It will be noticed that the characteristic of all these curves is similar to the curve of Fig. 1, although somewhat exaggerated, and the carburetor would be impracticable except as the quality of the mixture is constantly corrected by the motion of the throttle valve. Thus with the throttle nearly closed the quality of the mixture is shown by curve A. The quality of mixture with this curve becomes rapidly too lean, but the progressive opening of the throttle valve increases the gasoline supply until finally at full speed, with throttle wide open, if 120 feet of air per minute is being used, the quality of the mixture becomes normal, as shown by curve D. It will thus be seen that the quality of the mixture depends greatly on the skill with which the throttle is handled. In climbing hills, however, conditions are met where skill does not avail much, for when the engine slows down, with the throttle open, the driver finds himself "between the devil and the



deep sea, because it he leaves the throttle open the engine is flooded, as shown by curve D; and on the other hand, if he closes the throttle to correct the quality of the mixture he reduces the power so he must drop to a lower gear where the engine speed can be maintained. It will be seen by referring to curve D that a drop of speed that reduces the quantity of air from 120 feet to 60 feet also increases the gasoline ratio about 30 per cent., and at 20 feet per minute the excess is 80 per cent.

#### CARBURETOR WITH TWO INDEPENDENTLY AD-JUSTABLE SPRINGS.

Figs. 3 and 4 are diagrams from another type of carburetor in which an automatic method of increasing the gasoline supply for full power is provided. In this carburetor the usual air valve is controlled by two independently adjustable springs. One of these is always in control of the valve, and the other is intended to engage the valve when nearly the maximum power is being developed, and by its increased resistance the gasoline supply is increased.

Thus in Fig. 3 the second spring is adjusted to engage the valve when about 77 feet of air is being used, and above that the gasoline supply is increased, as shown. The throttling resistance of this arrangement, when adjusted as shown, is 22 inches of water at 120 feet of air per minute.

Fig. 4 represents the effect produced by another method of increasing the maximum gasoline supply without the second spring in service, and therefore with less throttling resistance. In this case a second gasoline supply is adjusted to be automatically introduced at a point where about 92 feet of air is being used. The result is a great excess of gasoline, as shown, but the maximum throttling resistance is only 20 inches of water against 22 when the second spring is used instead.

It will be noted that the mimimum capacity is unchanged by any of the combinations, and remains constantly at about 10 feet of air per minute, thus giving the carburctor a working range of 12 to 1.

It would seem that the great excess of gasoline of Diagram 4 is more objectionable than an increased throttling resistance, and particularly so in this case, because it occurs at a time when the best mixture for maximum power is desired, and when unnecessary heating of the engine is fatal.

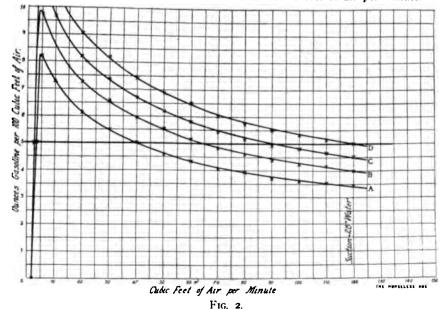
The foregoing fairly represents the performance of the several types of carburetors described, and also the effect of the peculiar features of each type. In each case a carburetor has been selected which is the product of the best known manufacturers, and those which are most extensively used.

#### THE PERFECT CURVE.

It has already been explained in connection with the several figures that a perfect gasoline curve should be a horizontal line across the centre of the sheet showing about 5 ounces of gasoline per 100 cubic feet of air at all times and under all conditions. It is proposed to show that practically this result may be obtained with a properly designed carburetor of the simplest construction without any supplementary attachments whatever.

It is unnecessary in this connection to describe this carburetor in detail further than to say that the quality of the mixture is automatically controlled by the air valve which is under the control of a single calibrated non-adjustable spring. No adjustments are provided except against the gasoline supply valve and an adjustment for correcting the gasoline level.

Fig. 5 is a diagram of the performance of a carburetor of this type. It will be seen that the minimum capacity of this car-



buretor is 2 feet of air per minute against 10, 3 and 10 feet respectively in the three types represented in the former diagrams, and the range of capacity is 60 to 1, as against 12, 40 and 12 in the former cases. It will be noticed also that at no point in the whole range is there an error in the quality of the mixture greater than 3 per cent.

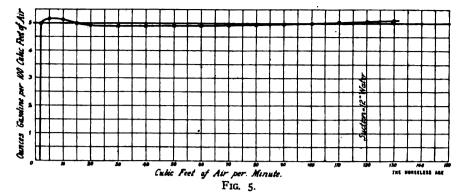
In comparing the throttling resistance a maximum equal to 12 inches of water is indicated, as against 23, 28 and 22 in the former cases. These astonishing differences can only be explained by assuming that carburetors heretofore have not been as scientifically designed as they should have been and in many cases have been "made to sell."

At the threshold of a scientific investigation of carburetors it will be discovered that the ability to give accurate performance with extremely small quantities of air is very important. In Fig. 5 the minimum capacity is 2 feet per minute, which makes it possible to have a very low maximum resistance.

A small minimum capacity necessarily implies a small regulating force in the air current, and therefore an air valve of considerable area must be used. An examination of the area of air valves commonly found in carburetors makes it evident that they never were expected to respond to small pressures. Furthermore, the resistance of the spring that opposes the valve must be exactly the right amount at every position of the valve, or the quantity of air admitted will not be in proportion to the gasoline supply. This means that the spring requirements must be definitely known and every spring calibrated and proved to be right. If a spring is not right there is small chance of making it so by adjustments. Even if an adjustment is found which seems to give good results there is no possibility of obtaining a wide range of correct performance with an adjusted spring.

#### LEVEL IN SPRAY NOZZLE.

Passing now to the consideration of gasoline supply, the absolute necessity of a constant level at the spray nozzle does not seem to have been realized. Otherwise no one would build a carburetor in which the



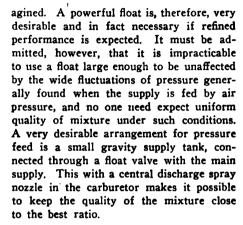
level at the spray nozzle is changed when a horizontal position of the carburetor is not maintained. The importance of the matter will be better understood by a reference to Fig. 6. Here the effect of a change of level of one-eighth of an inch is graphically shown. It will be noticed that so small a change of level as one-eighth of an inch changes the ratio of gasoline to air about 20 per cent. when 5 feet of air is being used per minute, and even when using 15 feet per minute the curve of gasoline ratio is about 15 per cent. in error.

The maximum effect of a change of level is felt at the minimum capacity as shown in Fig. 6, therefore a carburetor with a fluctuating level is not one that will give uniformly good results at very slow speeds.

To insure a constant gasoline level even with a central discharge, it is desirable to have a powerful float equipment, not only to overcome friction of the moving parts and insure quick response to small changes of level, but also to minimize the disturbing effect of varying pressures from the tank exerted under the float valve.

The displacement area of an ordinary float for a 1½ inch carburetor is 3 inches, and a tank pressure due to one foot of head exerted to open the float valve will balance a float resistance equal to one-sixteenth of an inch change of level in the float chamber.

Referring to Fig. 6, the effect of such a change of level will be appreciated. It is evident, then, that with a float capacity such as is ordinarily used the quality of the mixture follows the gasoline pressure from the tank more than would be im-



#### SUMMARY.

Reviewing the whole subject, it is evident that the following conditions must all be found in a carburetor if any refinement of performance is expected:

First.—The air valve must have area enough to insure prompt and accurate response to small changes of pressure.

Second.—The spring which controls the air valve must be exactly suited to the service both in regard to initial length and also its scale of resistance, and should not be adjustable.

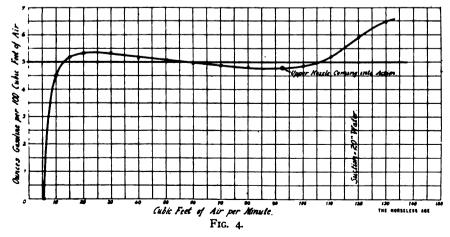
Third.—The gasoline level must not vary appreciably at the spray nozzle.

Delicacy of action in all these things does not imply a delicate and easily deranged mechanism, but, on the contrary, the result can only be realized by a rugged mechanism with power to overcome small obstacles and perform the desired functions with accuracy and certainty.

It is hardly necessary to say further, in view of the facts set forth in Fig. 2, that for the varying requirements of automobile service it is impossible to get uniform quality of mixture with any form of mechanical control, and generally a very low mileage is found with the arrangement, because of the flooding that occurs under certain conditions.

It is a self evident proposition, also, that a multiplicity of adjustments is undesirable and unnecessary, and their presence in a carburetor would seem to indicate that the builder was not quite sure what was wanted, but hoped the user would be able to work out a successful combination.

What would be said of a watch with numerous adjustments for patching up the



varying performance at different hours of the day?

A carburetor is a fairly parallel case, and if properly designed and calibrated so as to give a uniform quality of mixture throughout its whole working range the effect of a single regulating valve is to make the uniform quality richer or leaner, just as the single regulating lever of a watch makes the uniform speed faster or slower.

This gasoline regulating valve would not be necessary except for the fact that with very low barometer, as in high altitudes, the rarefied air contains less oxygen per cubic foot, and hence a relatively smaller amount of gasoline is required. This regulating valve should be the only adjustment on a carburetor, except one for correcting the level in the float chamber, the importance of which is shown in Fig. 6, and to do this conveniently the level should be visible.

ADJUSTMENT BY ENGINE SPEED CRUDE.

Nothing is more certain than that a carburetor carefully calibrated with a metering outfit cannot be improved by any subsequent adjustment on an engine. The method of "feeling" for the right mixture by observing the performance of an engine is exceedingly crude. A fair idea of the lean edge of the mixture may be obtained in this way, but the rich side is a wide open field into which the bad performance of imperfect carburetors dumps the wasted gasoline with little evidence of the fault. This fact becomes very apparent in testing carburetors taken from cars where they were supposed to have been doing good work. Fig. 2 illustrates a case of this kind. The carburetor making this diagram was first tested just as it had been used, but the diagram was so very poor that it was really "not fit for publication." The adjustments were then changed and the spring cut off and made shorter, and finally Fig. 2 was produced as the best possible performance when adjusted with a metering outfit.

The limitations of a magazine article prevent going into these subjects more fully, and it has only been possible to give rather briefly some of the most important facts that are made so very plain with a metering

testing outfit. No one could go through such tests as have been described, with the opportunity of checking the results with actual service on an engine, without being impressed with the crudeness of the usual method of engine testing as a means of developing and adjusting carburetors.

The conclusion is inevitable that the day of this sort of thing is over, and hereafter carburetors will be made on scientific lines and calibrated with a metering outfit, which will insure the same exactness of performance that is obtained with numberless other instruments of precision.

lt may be stated, too, without fear of successful contradiction, that it is now demonstrated to be practicable, both commercially and as an engineering problem. to design and build calibrated carburetors whose performance is so exact that the greatest error is a negligible quantity. This means that the mechanical control, the adjustable spring and the side float chamber must be abandoned, and an increasing number of users of carburetors will hereafter require guaranteed performance in regard to the maximum choking resistance, the range of working capacity and the amount of variation from a uniform quality of mixture throughout this range.

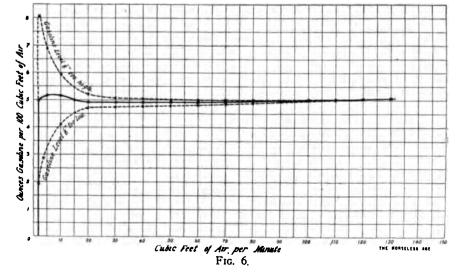
#### Piston Head Thickness.

BY F. E. WATTS.

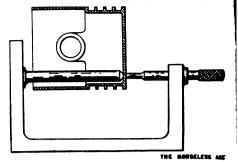
Several cases where pistons have failed owing to thin spots in their heads have come under my observation during the past year. It would seem that these annoying occurrences might be absolutely prevented by the inspection of these heads for thickness at various points. This might be done by a gauge similar to that shown in the sketch. The plunger would need only two graduations, one for the greatest and one for the least thickness allowable.

With some methods of chucking the thickness of the piston heads are automatically gauged, but even if this is the case an inspection is advisable if the pistons are of large diameter.

Similar methods might be applied to the inspection of cylinders, for cases have come



up within recent years where a lot of castings having the cores slightly too long have



PISTON HEAD GAUGE.

cost the engine manufacturer several hundred dollars, for the engines were placed in cars, and some of them shipped to owners before the heads began to break.

#### Popping in the Carburetor.

Novices in the use of gasoline motors are often puzzled and annoved by what is variously known as carburetor explosion, back explosion or popping in the carburetor. This is one of the easiest things to explain and remedy of any that may happen to a gasoline motor. The direct cause of the popping noise is an ignition of the gases in the inlet pipe and carburetor during a suction stroke of the motor. The gases are ignited by a flame in the cylinder after the inlet valve opens, left over from the previous explosion or power stroke Ordinarily combustion in the cylinder ceases soon after the exhaust valve opens if not before, but when the mixture furnished by the carburetor is very lean-that is, when it contains too small a proportion of gasoline-it is very slow burning, and the remanent gases which remain in the cylinder at the end of the exhaust strok: still continue to burn. As soon as the inlet valve opens these slowly burning gases come in contact with the new charge enter ing the cylinder and cause the explosion of the charge in the inlet pipe and carburetor.

The "leanness" of the mixture may be due to improper adjustment of the gasoline needle valve. Often carburetor explosions occur when the supply of fuel in the tank has become exhausted and the level in the float chamber and spray nozzle gets low in consequence. Another possible cause of lean mixture is loosening of the spring on the supplementary air valve, which causes this valve to open too far for any given motor suction, thus diluting the mixture too much with air.

It is a good idea when instructing a novice in the operation of a gasoline motor to bring about popping in the carburetor artificially, and to explain it to him.

The Paris Automobile Show for 1909 has finally been definitely abandoned. The committee of the A. C. of France decided to bow to the desire of the Manufacturers' Association, and to postpone the show until next year.

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#### The Glidden Tour.

In a recent editorial we pointed out that the Glidden Tour would be a very severe test, and that only the most substantially built cars could be expected to go through with a chance for the prizes. From the entries made it seemed that not all of the manufacturers agreed with us, but even the first few days proved our view to be correct. We have always believed that in order to make an average speed of about 20 miles per hour over ordinary country roads for many days in succession a car is required not too light, thoroughly well proportioned, and equipped with good flexible springs and liberal sized pneumatic tires. Such a speed is beyond the practical limit of solid tires. It must, of course, be remembered that an average of 20 miles per hour involves much higher temporary speeds.

It is no discredit to the small, low priced cars that they could not keep up this pace. The man who wants to drive at such speeds over country roads "has no business" buying a car in the \$1,000 class. High

speed is expensive, and the present tour has again shown that one of the chief differences between high priced and low priced cars is that the former are able to maintain a higher average speed without mechanical trouble.

The contest this year differed in many respects from those of the several preceding years. It may have been severer than any contest previously held in this country-this was the verdict of many "veterans" taking part-but it is doubtful whether it really can compare with the New York-Pittsburg Tour of 1903 for severity. Had the weather conditions of the earlier tour been superimposed on the long daily distances of the recent one, all records for severity would certainly have been broken. As it was, the hot weather was no doubt quite severe on the tourists, but motor cars are little affected by high atmospheric temperatures, and aside from the heat the weather was favorable all through.

According to reports there was again considerable grumbling and crimination toward the end of the tour. In our opinion it will never be possible to separate this entirely from a contest of this kind, for the reason that a severe endurance test of automobiles cannot be had without submitting the drivers to a very severe test of physical endurance, and it is a well known fact that many men are ill tempered when in a state bordering on physical exhaustion. Endurance contests, in order to be of any value at all, must be made more severe each year, because cars are constantly being made more reliable and more durable, and in this development a point must eventually be reached where further progress is checked by the limits of human endurance. Indeed, it is quite obvious that even now the skill and endurance of the drivers is an extremely important factor determining the records of the individual cars. For instance, toward the end of the tour washouts about 6 feet wide were encountered which proved the undoing of several competitors. Such an obstruction is dangerous or not according to whether it is seen in time. A driver who is exhausted by the strain of long, continuous driving over rough roads and lack of sleep is naturally much more apt to fail to see it in time than one who is fresh and alert.

A new feature of this year's tour is the technical examination, and, as might have been expected, this really determined the winners. That is, there were still a number of clean scores in both the Glidden and Hower competitors when the cars reached Kansas City, but the technical examination led to the imposition of penalties which eliminated all but one perfect score in each contest, and proved therefore the deciding factor. The honor of victory is naturally prized very highly among so many contestants, but a creditable showing just failing of victory is undoubtedly gaining in value, relatively. With the great multiplication of contests a man is not likely to be much impressed by the fact that a car won a certain contest unless he actually read an account of the contest and knows the conditions under which it was held. And if he does read the reports he must perforce admit that the car which came through with no more serious damage than the breaking of a fender iron made practically a perfect record.

That the Glidden Trophy has been won for the fifth time and the Hower Trophy for the second time by one and the same make of car is unique in the annals of automobile competitions. It would seem to show the value of what might be called specializing in the participation in contests. The manufacturer of these cars never enters races, and his cars are seldom seen in other contests than the Glidden Tour. But for this one great event of the year evidently the most thorough preparations are made, the best drivers secured, etc. This manufacturer entered four cars, more than any other single manufacturer, and, therefore, had originally the best chance of winning at least one prize. But the showing made is, of course, far better than could be explained on the basis of superiority of numbers. It should be pointed out, however, that this year's Glidden Tour was not very strenuously contested, in so far as most of the leading American makes, ranking with the winner in popular estimation, were not represented.

The Glidden Tours are undoubtedly on the decline, as is shown by the annually decreasing number of entries, and at the moment it appears extremely doubtful whether the tour will be repeated again. Of course the more the number of entries shrinks the greater the chances of the individual entrant, and this is one feature which keeps alive competitive events that are disapproved of by the industry on the whole. New York-San Francisco has been suggested as a suitable route for next year's contest, but we do not believe the plan will appeal to the manufacturers.

#### Writing for the Technical Press.

The habit of writing for trade papers often proves valuable in more ways than one, and it seems strange that so small a percentage of the mechanical men in the automobile trade have yet formed it. Of course, this has always been a "high pressure" industry, where liberal salaries are paid to good men, and where these men are kept pretty busy. Nevertheless, there are a great many who are fully capable of writing interestingly and have sufficient time to do so, who have either never given serious thought to the matter as related to themselves or have failed to overcome their mental inertia sufficiently to actually set to work.

In older lines of manufacture there are a far greater number of workers who find it profitable to contribute to trade papers. Besides the money received directly, which often makes the work very profitable when only the time spent is considered, contributions sent regularly to a reputable journal may be regarded as a form of insurance against lack of employment. Owing to changes in organization or plans even the best specialist is liable to be thrown temporarily out of employment. But if he has been sending contributions regarding his special line of work to such a paper as THE Horseless Age he has, without knowing it. been forming a national reputation for himself. His articles have been read by numerous factory heads, by men who employ others to do the work they have neither the time nor the training to do. As a consequence they know him, his methods of thinking and working, and have already estimated his ability, for the man who leads always measures the minds with which he comes in contact. Hence it is much easier for a contributor to the technical press to get employment from those who have read his articles than it is for a stranger.

This is not theory but a proven fact, and the following incident, which occurred a few weeks ago, furnishes a good illustration of this assertion.

A manufacturer of automobile specialties wanted a man for a position which required technical ability and some knowledge of salesmanship. The position was a good one, paying several thousand dollars a year. After a mental canvass of all the men he knew of connected with the trade, the choice narrowed down to four contributors to our columns. One of these was finally engaged.

#### Profits in the Automobile Industry.

The large profits reaped in the past several years by a few firms engaged in the manufacture of low priced automobiles seem to have had the effect of encouraging the organization of new companies on an unprecedented scale, and great efforts are at present being made to interest new capital in the automobile industry. As is usual under such conditions, the few exceptional instances where enormous profits have been made are held up as typical examples, and the promise of similar profits is held out as bait to the investor.

It is undoubtedly true that a few men have made fortunes in the automobile manufacturing business in a short time by correctly prejudging the trend of the public demand and putting through such large lots of cars as to enable them to sell at unusually low prices. But these cases have been exceptional, and not every company that prepares to turn out cars on a large scale can hope to meet the same success. Some of those who have made enormous profits recently had been producing cars for years without conspicuous financial success. Moreover, the general increase in the output of low priced cars is bound to make competition in this line much keener inside of a few years.

In view of the highly colored newspaper reports of profits made in the business, we believe investors should be informed of the real state of affairs. On the average the profits made in the industry the past four or five years have been very moderate. A great many manufacturers have had difficulty in making ends meet, and for every one of the phenomenal successes there have been at least a dozen failures. The manufacturers' committee on the tariff in its brief to the Ways and Means Committee made the significant statement that "it was doubtful whether twenty of the 253 manufacturers of automobiles in the country could show a fair profit." With the standardization of design and the widening of the markets the chances of profitable business in the industry have undoubtedly increased; but, on the other hand, sooner or later, the danger of overproduction must be faced. Then the strongest companies, those with ample financial backing, capable engineering staffs, and efficient manufacturing equipment, will survive, while the weaker ones will be forced to the wall. The boom period cannot last, and those who invest unwisely in automobile companies are likely to lose their investment.

#### Calibration of Carburetors.

Carburetor action is admittedly a very complex phenomenon, and very involved mathematical formulæ are required to represent the variation of gasoline emission from a spray nozzle with varying suctions, However, the law of a perfect carburetor is ideally simple, and very simple tests are needed to show whether a carburetor follows this law fairly closely throughout the range of engine speed. Although the point has often been disputed, we believe that a carburetor that gives a mixture of constant proportion throughout its whole range of action fully meets the requirements in this respect. Most of the best carburetors at present on the market give a fairly constant mixture over a considerable range, but when the suctions attain extreme values the proportion usually changes materially. the mixture being always rich at intense suctions (high speeds) and lean at weak suctions (low speeds). The problem now consists in extending the range of substantially constant mixture proportions, especially in the direction of weaker suctions, so as to enable motors to be operated at extremely slow speeds without popping in the carburetor and without unnecessary waste of fuel.

An experimental study of the subject has been made by Frank H. and Fred O. Ball, who describe their experiments elsewhere in this issue. Messrs. Ball reach the conclusion that a carburetor can be made to give a mixture of constant proportions at practically all suctions, and the most important feature of such a carburetor is a calibrated spring; that is, a spring which will compress definite amounts under all suctions. Nothing further is said as to the conditions, but presumably the outline of the supplementary air valve must be made of special form.

The great importance of accurate automatic regulation of the mixture proportion is well shown by the results of recent economy contests. Of cars of fairly similar design one often produces more than twice the ton miles per gallon of fuel as another, and there can be little doubt that the most important factor producing this difference is lack of automatic carburetor regulation in the least economical car. If the same amount of power were generated in both, and the excess loss in one expended in overcoming bearing friction, etc., the bearings on that car could hardly fail to give incessant trouble from overheating and to wear out rapidly.

#### The Sixth Annual A. A. A. Reliability Tour-IV.

BY CHESTER S. RICKER.

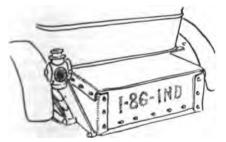
#### Denver to Hugo.

Hugo, Col., July 27.-Much trouble was experienced by the cars today with their carburetors, but this was due to a large extent to the high elevation, the highest point on the entire tour being reached. At Palmer Lake, 47 miles from Denver, the elevation was 7,235 feet, and the rise between the two points was 1,955 feet, or almost 42 feet per mile average grade. It is evident, however, that not only the elevation but the grades encountered had some effect on the operation of the motors.

The greater part of the distance the roads were good. To Colorado Springs, 80.5 miles, they were excellent, except for a few short stretches of sand. All the hills were quite steep and in several cases resembled a roller coaster, so quick was the drop when traveling 35 or 40 miles an hour. After leaving the Springs, however, the roads grew more sandy, until about 110 miles from Denver we again traveled over the narrow grass grown prairie roads. The grass grows so high on these that one cannot see more than 150 feet in advance, and, to make it worse, the roads are very winding.

#### STOP AT COLORADO SPRINGS.

The route to Colorado Springs was along the base of the mountains. Pike's Peak was in sight almost the whole distance. Arriving at the Antlers Hotel all the cars checked in at a control which was provided. Police watched the cars during the stop, in order to permit the tourists to visit points of interest thereabouts. Two hours was considered sufficient by Chairman Hower for the purpose. Our party checked in and hired an automobile to take us through the "Garden of the Gods" and over to Manitou Springs. This trip took about an hour and a half. The remainder was spent in indulging in the first hot lunch which we have had during the tour. A large portion of the



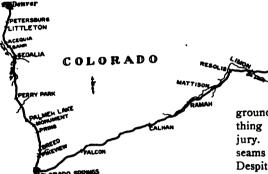
Marmon Suit Case Rack and Cover.



American Simplex, No. 51.

contestants did the same, and I have only mentioned our experiences as an example. ON THE ROAD.

For the first time during the tour the writer did not ride in Webb Jay's Premier No. 1. An opportunity was given to ride in the American Simplex Detroit Trophy contestant, No. 51, driven by Walter A. Wood. This car has the only two cycle motor used by a contestant, and in addition is reputed to have the finest spring suspension of any car in the tour. To verify these



statements the writer was only too glad to accept the offer of a seat.

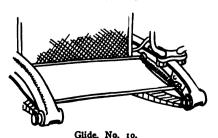
The run to Colorado Springs was uneventful. We arrived at 10:04, two hours and fifty-six minutes for 70 miles' running. The riding was superb. Although the writer has ridden in many fine and high priced cars it was a surprise. Further evidence of a still more strenuous character was in store, however. Two washouts were met along the road. Recent rains had washed a 6 foot ditch straight across the road in the first case. No danger sign was posted, and



Special Covers on Moline Cars



Chalmers, No. 52.



and we plunged into the other side of the washout. As it was only about 4 feet wide we were hung up on our frame. After an hour's work and the combined efforts of the crew and the Studebaker and Maxwell press cars, our car was dragged back to level ground again. The radiator was the only

it is surprising that only one car had an ac-

cident. Teddy Day escaped it by a hair's

breadth. The confetti car dashed into it.

but only one wheel dropped off, and as the

car was light, little difficulty was experi-

enced in getting it back on the road. It re-

mained, however, for the car in which the

writer was a passenger to go in right. We

were traveling about 30 miles an hour when

the ditch, only 100 feet away, seemed to rise

up to meet us. Wood did everything in his

power to stop and get out of the deep ruts

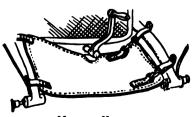
in which we were traveling. So deep were

the ruts that the effort was without avail.

thing on the car which did not escape injury. This rested on the ground, and the seams of the lower tank were badly opened. Despite this we continued the remaining 70 miles, and although we had lost nearly an hour in removing the car from the hole in which it was, we checked in on time. To make a three and one-half hour run in two and one-half hours over roads on which one could hardly see more than 100 yards ahead most of the time took skill on the part of the driver and a good motor to keep it going. The easy riding which I have referred to before was a factor in making this speed possible as far as comfort is concerned—the motor did the rest. The motor is so noiseless that at many times it was impossible to tell from the back seat whether it was running. There is much expression of regret among the other tourists that a perfect score should be spoiled by such an unfortunate accident. If a sign of some character had been posted it would have been different, but such was not the case, and it is very fortunate that no one in the car was killed.



Maxwell, No. 107.



Marmon, No. 4.

How Some of the Cars Were Rigged Up for the Tour.

RUNNING TIME.

Class A-8 hours 40 minutes.

Class B-8 hours 55 minutes.

Class C—9 hours 10 minutes.
Class D—0 hours 55 -9 hours 25 minutes. Class E-9 hours 40 minutes.

Distance, 173.5 miles. A two hour stop under control was allowed at Colorado Springs, the observer noting the time of arrival and departure. PENALTIES.

Two clean scores were spoiled today. One of the cars incurring its first penalty was, as was stated above, the Simplex. No. 51. The other car which lost its clean bill was the White steamer, No. 14, driven by H. N. Searles.

In detail the scores are as follows:

American Simplex, No. 51, 1.2 points for time working on the radiator and tightening the steering gear, which was severely wrenched when the car was ditched. To this was added 0.2 point more for material which was used to try and stop the leak in the radiator. Altogether this made 1.4 points against the Simplex. This leaves the Premier entry, No. 53, the leader in the Detroit Trophy class, the scores of the competitors in this contest being as follows: No. 53, Premier, 0.8 point; No. 51, American Simplex, 1.4 points, and No. 52, Chalmers, 6 points. Thus no competitor in this class has a perfect score. The White steamer received 16 points for tardiness and 2.2 points for repairing a lubricator pipe, this making a total of 18.2 points against it.

Through some mistake in calculation of the penalties on July 21 a penalty of 16 points was imposed on the Jewel, No. 7, but this has been reduced to 8.8 points. No. 10, Glide, which had spring trouble last Saturday, today replaced the spring which was reported as replaced at that They then only made a temporary time. repair by winding it with wire, so as to reach Denver at least. Today they replaced it completely. The penalty, however, has not been reported.

Neither the Hupmobile, No. 106, nor the Brush, No. 104, arrived tonight. The Hupmobile is reported to have broken a connecting rod, while the Brush is said to have turned turtle in one of the ditches. No confirmation has been received, but the car has not shown up either.

HOW THE CARS HAVE CLIMBED.

Council Bluffs, elevation 981 feet.

Rise 1,145 feet in 200.2 miles to Kearney, 2,126 feet.

Rise 1,324 feet in 206.2 miles to Julesburg, 3,450 feet.

Rise 1,830 feet in 204.8 miles to Denver, 5,280 feet, one mile high.

Rise 1,955 feet in 47 miles to Palmer Lake, 7.235 feet.

Descent 1,245 feet in 23 miles to Colorado Springs, 5,990 feet.

Descent 990 feet in 102 miles to Hugo, 5,000 feet.

#### Hugo to Oakley.

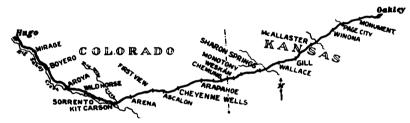
OAKLEY, Kan., July 28.-The latter part of yesterday's run was bad, but today's run was the limit! So rough were the roads that it was impossible for the cars to average better than 12 or 15 miles per hour

for the first 40 miles. That is to sav. the cars were about an hour late after running only three hours. Worried by this lateness. and not certain as to the condition of the roads which were to come, most of the cars "burned up the roads," irrespective of the condition, after that. Of course, the roads improved somewhat later in the day, but were no better than those encountered during the last three days.

Not only did these roads tax the endurance of the drivers, but they eliminated two cars and broke the perfect score of another. The Mason, No. 112, which had been doing so well up to now, arrived The press cars also had their very late. fill of trouble today. The Studebaker press car, No. 81, driven by Harry McIntosh, broke both front axle spindles, it is reported. The other press car, No. 80, also had an accident which smashed the radiator. To the Maxwell press car, No. 82, is due the credit of towing in the big Thomas which was disabled. Pete Esty, one of the reporters on the tour, remarked tonight that even if the press cars did get through the press men had to work their passage. He was on the Maxwell, and knew. Howthe water nump connection was broken at the same time, and before Buse knew it the motor ran hot and "froze" fast. The explanation given of the accident is that the brakes did not hold well enough to stop the car before it came to the ditch. Withdrawal, of course, was the only possible procedure under the circumstances.

Maxwell, No. 6, driven by Gager, was unfortunate in losing a clean score today, and was the only car to do so. The penalty was incurred by the replacement of a spring which had broken the day before. The points were 4.5 for material and 4 for labor, making a total of 8.5 points

The other Maxwell, No. 107, had the same trouble; that is, a front spring had to be replaced. Goldthwaite, the driver. thought it best to replace the spring, although it was not entirely necessary to do it; 4.5 points were imposed for material and 3.2 points for labor, making 7.7 points total for today. Many of the tourists have commented on the consideration which Goldthwaite has given to the other users of the road. When he is passing another contesting car he always drives as fast as possible so as not to throw dust in



ever, many of the competing cars are much indebted to the press cars for helping them out of the numerous mud holes and ditches in the first part of the day's route.

#### THE ROAD IN BRIEF.

The route from Hugo to Kit Carson lay along the edge of the Big Sandy River. On account of the heavy rains which had fallen here lately the surface of the road was cut up by narrow, deep cross gutters from the hillsides. These were not more than a yard apart for miles on end. But this was not the worst. Several mud holes and washouts further helped to delay the contestants. After leaving Kit Carson the roads were much better, and many of the cars arrived here anywhere from a half hour to an hour ahead of their schedule.

#### TROUBLES IN DETAIL.

The first cars to come to grief were the Studebaker press cars, Nos. 80 and 81. The first, No. 81, broke both front axle spindles, and is practically out of the run. The other, No. 80, broke its radiator, and has not arrived here yet. The train service here is not what it is in the East, and it was not until late that the stranded press men reached here.

Thomas, No. 11, driven by Gus G. Buse, has met its finish. Near Monument, about 11 miles from Oakley, the Thomas struck an unseen ditch while traveling at a high rate of speed, and the sub-frame was broken. This was not the only trouble, however, for

the faces of the occupants of the other car. On the other hand, when one desires to pass him he always turns aside and gives one the whole road if possible.

Glide, No. 10, driven by A. Y. Bartholomew, received its penalty tonight for a spring which was replaced yesterday, 12.4 points being charged for the spring and 16.4 for the time required to replace it. Further trouble occurred today which will probably cause the withdrawal of this car also. One hundred and thirty miles out of Hugo the front spring perches revolved around the axle, and at the same time the steering arm broke, causing the car to dash from the road. On the way in here the axle turned around five or six times and great difficulty was experienced in reaching here at all. No penalty was announced, nor is it definite what will be done with the car.

Shortly after 10 o'clock the Mason, No. 112, arrived. The tie rod between the wheels is reported to have broken and to have caused the trouble and delay. The Chalmers press car, No. 83, turned out a crank pin bearing.

#### TIRE TROUBLES.

Trouble with the tires has been quite frequent today, although not in any way so bad as might have been expected in view of the condition of the roads. The only cars having trouble were Nos. 1, 2, 4, 6. 9, 14. 102 and 52. Until today Chalmers,

No. 52, had not had any tire delays. Jean Bemb, the driver, had been trying to go the whole tour with Detroit air in all his tubes, and all but succeeded.

RUNNING TIME.
Class A—8 hours 15 minutes.
Class B—8 hours 30 minutes.
Class C—8 hours 45 minutes.
Class D—9 hours.
Class E—9 hours.
Intance, 165 miles.

#### PERFECT SCORE CARS.

No. 5 Marmon. Howard Marmon
No. 8 Pierce. F. S. Day
No. 9 Pierce. W. F. Winchester
Hower Trophy cars with perfect scores:
No. 101 Moline. J. A. Wicke
No. 105 Chalmers. J. Machesky
No. 108 Pierce. J. A. Williams
No. 109 Pierce. C. A. Scofield
No. 114 Lexington J. C. Moore

#### WATER IN THE GASOLINE.

A humorous but disagreeable incident occurred this afternoon on checking in at the night stop. Premier, No. 1, and Chalmers, No. 52, were taking on gasoline side by side. The Premier carries a 5 gallon gasoline can filled with water for emergencies. As the can was exactly similar to the ones in which the gasoline was brought to the cars, one of the garage employees took it by mistake and poured about a gallon of water into our tank. The mechanic, however, discovered it before more was poured into it. Shortly afterward the same boy unthinkingly poured the remainder of about 4 gallons into the Chalmers tank. We were able to make the control, but the Chalmers was not so fortunate. The chairman, however, will permit the driver of that car to drain and refill his tank without any pen-

#### RAPID TRUCK UP PIKE'S PEAK.

Sunday the Rapid truck, No. 75, which has been acompanying the tour, left Denver at 4:15 a. m. It reached Colorado Springs at 11:30 p. m. It left the next morning at 6:15, and nearly reached the top of Pike's Peak when it was enveloped in a cloud and was unable to proceed further, owing to the dangerous nature of the road. The night was spent on the peak. Grogan, the driver, was lost from the party, and not "ntil morning did he find his way back. The car reached the summit early the next noming, however, and after finding that it would cost \$100 to take the car down by rail it was brought down on its own wheels. The crew consisted of the driver, Grogan, the mechanic and a photographer. At 3:30 5 m. this morning (July 28) they left Colorido Springs to catch up with the tour.

#### Oakley to Salina.

SALINA, Kan., July 29.—This day has been the most trying to the drivers in the tour so far. The heat was intolerable, and here were several cases of near-prostration. Mr. Glidden took the temperature en route, and stated that at one time it was

122 degrees on the road. In the shade it was over 100 degrees. To drive 199.7 miles in this furnace was the fortune of everyone on the tour, except the chairman and a few of the press men, who could not find seats in the cars.

Except for the heat the run would have been very pleasant. The roads were very good, except for some hills in the afternoon, which were rough and stony. None of the cars had any difficulty in making the schedule, and many were an hour or more ahead.

One certainly seemed to be getting back into civilization again when towns were found every 10 or 12 miles. The people also were enthusiastic over the tour, and in every town the cry is to "let her out," so they can see the great race. They seem disappointed in many cases when they learn that the Glidden Tour is not a race. Many automobiles are now met along the road, whereas only the day before yesterday it was a rare sight to see a house.

The roads, instead of being bare of vegetation and bounded only by the horizon, are lined with fields of corn, oats and

No. 53, the Premier Detroit entry, had to stop and wire the rod pan in place, and received a penalty of 1.5 points.

The Jewel, No. 7, also received a penalty, but for a repair which was made on the 29th. The fan belt was tightened, and for the time consumed 1.7 points were assessed, to which 0.6 point was added for material.

No. 11, the Thomas, was withdrawn. The reason given for the withdrawal was stated in yesterday's report.

RUNNING TIME.
Class A—10 hours.
Class B—10 hours 20 minutes.
Class C—10 hours 40 minutes.
Class D—11 hours.
Class E—11 hours 20 minutes.
Distance, 199.7 miles.

#### Salina to Kansas City.

Kansas City, Mo., July 30.—Weary and dust covered the tourists finally arrived at the end of their 2,657.3 mile journey. Kansas City welcomed us with open arms. As Dai Lewis predicted, the day's journey was the hardest that we have had during the tour. In addition it was the only day we have had rain during the tour. The rain



wheat. Indeed, this is one of the chief grain raising States of the Union.

#### PENALTIES.

There were few penalties tonight. The Glide is the only car not in yet. The penalties for last night, which were not announced at that time, were given out tonight. No. 10, the Glide, was one of the penalized cars, the Mason, No. 112, the other.

The following are the penalties: No. 10—material, 0.2 point; outside tools, I point; labor, 56 points, and lateness, 296 points. This makes a total of 353.2 points for last night. All the trouble was with the springs and the steering gear, as was mentioned in yesterday's report.

The Mason, No. 112, which had a heated piston pin, caused by running out of water, was penalized 6.3 points for material and 25.7 points for labor required to put it in condition again. Lateness added 215 more points, making a total for the day of 247.

Among the other cars receiving penalties were the White, No. 14, which received 0.4 point, 0.3 of which was for time taken to wire a fender in place and 0.1 for material.

No. 111, Jewel, had to repair the gasoline pipe line and received 1.1 points; for cleaning air pressure line it was penalized 1.5 points, making a total of 2.6 points.

was welcome, inasmuch as it cooled the air and laid the dust, which latter was very discomforting yesterday. On the other hand, it made the roads very slippery, as those with a gumbo bottom always are under the circumstances. At Topeka it was reported that over an inch of rain had fallen during the night, and the condition of the roads quickly made this evident.

Two perfect scores also fell by the way today, thus leaving only eight perfect road scores. The cars losing out were the Lexington, No. 114, and the Chalmers, No. 105. Cars which received further penalization were the Maxwell, No. 107, the White steamer, No. 14, and the Premier, No. 53. Among the cars which were seen in trouble today was the pilot car, an E-M-F, which was passed about 16 miles out. The car had been abandoned, and it appeared as if it had had rear axle trouble. At 188 miles out the confetti car also was passed. The reason given for it not being "on the job" was that with the terrible condition of the roads it was impossible to keep up to the schedule. The Premier pacemaker, No. 99, picked up the pilot, Dai H. Lewis, and brought him into Kansas City. The Studebaker press car, No. 79, was passed on the road, and was evidently in difficulty, as the American Simplex, No. 51, was endeavoring to tow it. The little



Maxwell press car, No. 82, had its magneto fail, and had to go back through the mud about 2 miles to get batteries in order to get through.

So slippery were the roads immediately after starting that it required the use of tire chains on both front and rear wheels to keep the cars any where on the road. As it was the cars would slide from side to side, often having very narrow escapes from serious mishaps. This continued as far as Chapman. For about 15 miles beyond, however, the roads were dry and dusty, and then again they became muddy, and remained so all the way here. The first part of the way was quite level, but the country became more hilly as we approached Topeka, and beyond was very hilly and muddy. Instead of gumbo we now had a slippery clay, which was probably worse. Except for the first hour the day was without rain. The distance was the longest which the contestants had had yet, and coming at the end of such a long and arduous tour it was not without its

Class A—10 hours 39 minutes.
Class B—10 hours 59 minutes.
Class C—11 hours 19 minutes.
Class D—11 hours 39 minutes.
Class E—11 hours 59 minutes.
Distance to be covered, 212.8 miles.

ON THE ROAD.

THE HORSELESS AGE representative was a rear seat passenger in the Pierce Arrow, No. 8, driven by the veteran tourist "Teddy" Day. The big Pierce checked out at 7:07 and finished the run at 5.33, over half an hour ahead of time. All four of the perfect score Pierces checked in first today. As we were in the lead of the procession after a few hours, little was seen of the remainder of the contesting cars. Little can be said about the Pierce which is not already known. Being a large car it rode as all such should ride, and an average speed of 25 miles an hour was maintained throughout the day, irrespective of the road conditions. This, it should be considered, was over roads which were anything but passable, and yet the trip was without the least fatigue to the passengers.

#### HOW THE DRIVERS DRIVE.

It has been a most interesting study to note the way the various cars are driven. Take the little Brushes. Their drivers open the throttle wide and let them go at the same speed whether on straight away or on turns. They are so short and their speed is such that this is possible. Another car which has come in for much comment is the Mason, No. 112, driven by Roy Snyder. Whenever the writer has had an opportuni-

ty to observe this car on the road he noticed that it was driven very much in the same manner as the Brush cars. For a little two cylinder motor with a long stroke it surmounts hills on high gear in a surprising way, and the car plugs away on high gear most of the time.

With some of the larger cars the drivers negotiate turns at high speed, and also run fast on the straight stretches. On hills the majority of the drivers try to hold their high gears as long as possible, and probably strain their motors far more than they would if o lower gear was used sooner. This, however, was not the manner of driving employed by "Teddy" Day. His methods, which have been so successful in former years, may be of interest to readers. Seldom does he take a corner faster than to miles an hour, which is probably the reason why he experienced only one puncture during the whole tour and carries Detroit air in three of his tubes. It is on the straight stretches and on the hills that he makes time. On the hills, especially, he gains minutes over most of his competitors by using his lower gears before the motor begins to pull hard, and thus keeps up his average rate of speed.

#### HOW SOME OF THE CARS LOOKED.

The cars were undoubtedly severely tried by the road conditions today after such pounding as they have had. Many steering gears are very loose, and this will appear in the report of the technical committee in a few days. Much to the surprise of many axles have given very little trouble. The Glide, No. 10, has had some serious difficulties with its steering arms as well as the spring seats working loose and the axle turning over. The Jewel, No. 7. came in tonight with the front axle slipped fully 5 or 6 inches farther forward on the left hand side than is normally the case. The other Jewel, No. 111, broke a front spring and came in with the axle lashed to the frame. Another car having trouble with running gear was the Midland, No. 12, which has the right rear wheel spokes so loose that the wheel is almost on the verge of collapse. On the Premier cars all the fan belts are off. In each case the hook connecting the ends of the belt let go and the belts came off, and, remarkable to say, the motors kept quite cool if the sides of the hoods were left open. This the drivers always did. Two of these cars, by the way, broke their rear springs just where they are attached to the frame. The last two days two have been riding on the rear axle bumper. Cars Nos. 12 and 8 have no starting cranks. The crew of Midland, No. 12, is in the habit of jacking up the rear wheel and starting the motor in that manner. The Pierce runabout, No. 109, driven by Scofield, dropped its trunk rack and tool box on the road, and is now carrying them strapped beside the rumble seat.

#### PENALTIES.

Cars Nos. 1 and 2, both Premiers, 8 and 9, Pierces, and Marmon, No. 5, still have



THE ARRIVAL IN KANSAS CITY.

ills in the Glidden Trophy contest. Hower contest only the Moline, No. d the two Pierces, Nos. 108 and 109, ean scores.

White, No. 14, had added to its score I point for material and 6 for, making a total of 7. Moline, 12, likewise had added 29.5 more to its demerit score, of which 16 r tardiness, 13.3 for labor and 0.2 terial.

to5, the Chalmers roadster, which is by Machesky, injured the edge of its rims today and replaced the wheel on which the injured rim was. w wheel was taken from the Chalress car, No. 83, and since it was rom another car the penalty is dis-

hwaite's Maxwell, No. 107, had trouble with its spring and had to a blacksmith's to have it repaired. stailed a penalty of 23.5 points, ditailed a penalty of 23.5 points, ditailed a penalty of 23.5 points, ditailed a penalty of 23.5 points for tardiness, nt for material and 2 points for

111, Jewel, added some more points penalties. It was charged with 0.4 or material and 4.6 points for labor, a total of 5 points.

Lexington, No. 114, was penalized 0.2 or tightening the driving member rear axle, which, of course, was sufto spoil a clean score. This means road score. The scores may stand by differently when the technical tee gets through with its examina-

ateness the American Simplex, No. 3 given 4 points penalty. No. 53, mier in the same contest, had to rehe rear spring which was broken sday. The penalty thus incurred has been announced.

o'clock tomorrow morning the techmmittee will take charge of the cars,
are parked in Convention Hall, and
the examination which has caused
th worry on the part of the con. This will consist of an examinaf axles, wheels, frames, motors,
pumps, radiators, flywheels, clutches,
ssions, universal joints, differential
etc. The committee consists of
Souther, a well known New England
ang engineer and metallurgist; Josacy, well known in racing circles,
writer.

#### At Kansas City.

rists arrived on Friday and parked ars in Convention Hall as they art was not until late on Sunday afterat the latter were released from the of the technical committee.

HE TECHNICAL EXAMINATION.

ning at 8 o'clock on Saturday morncommittee were kept busy examincars for defects which would re-

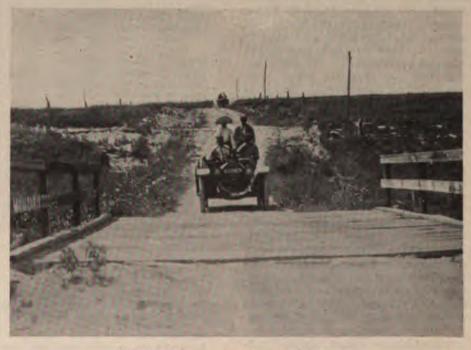


PIERCE, No. 8, ONE OF THE FOUR PIERCES WITH PERFECT ROAD SCORES.

quire replacements and thus penalize them until 2 o'clock Sunday morning. This, as may be imagined, was not very satisfactory to the contestants who had to be with the cars which were being examined at that late hour. Most of the drivers and observers had risen about 4 on the morning of the run to Kansas City, and very few were able to get much rest that night, so hot was the weather. This was followed by an all day wait until their particular car was examined, and so they were naturally extremely fatigued. Sunday morning the examination continued, and it was finally completed at about 3 o'clock in the afternoon. Several of the tourists expressed

dissatisfaction because they could not attend the automobile races which were held on Saturday.

In making the examination the technical committee took into consideration the condition of the various parts of the mechanism. Each part was gone over separately, either by Joseph Tracy or Henry Souther. Usually one took care of one kind of parts and the other of another kind. After each car had been subjected to this technical examination it was taken out on the road and given a short test run to determine the condition of the running gear and of the motor. The brakes were also tested at this time. Although there was no penalty for



MARMON, No. 5, WITH PERFECT ROAD SCORE.

#### THE HORSELESS AGE.

brake adjustment, the committee tried both foot and hand brakes on each machine. In most cases adjustments had to be made, and it was intended to penalize such cars as could not make such adjustments. All the cars, however, were able to slide their wheels before they were finally passed upon. The braking equipment of the Premier and the Marmon cars proved exceptionally good, for it was claimed that they had not been adjusted on the tour, and it was observed in each case that either brake was sufficient to slide the wheels. The final examination on Sunday consisted of going over the frames, and after a thorough examination only one frame was found the worse for the hard pounding that had been given them. This was on the Jewel, No. 7, which had a crack along the edge of the left front side member, extending several inches in either direction from the lamp bracket. The penalty imposed was for a new side member and not for a whole new frame

#### THE ROAD EXAMINATION.

As the road examination was given with the hoods off and with the footboards out in most cases the noises which are usually muffled were quite evident to the examiners. A short hill was included in the test, and most of the cars were required to use their second speed in climbing this. The noise arising from the gears in some cars was quite disagreeable. On the other hand, there were cars which were as remarkable for their quietness. Marmon, No. 4, and Maxwell, No. 6, were chief among these. The drivers of the Pierces, on the other hand, acknowledged that the noise of their gears was objectionable to many people, but that it was the policy of the company to make them give out a certain amount of noise, a policy also followed by the Panhard Company. The motor on Frank Wing's Marmon ran perfectly, and was inaudible, except for the whispering noise of the carburetor. The motor of the Maxwell, No. 6, also ran very smoothly. These are both motors with valves on opposite sides. The Pierce motors, which also have "tee" motors, were next in order. Strange to say, the motors with valves all on one side, which, making the exception of the Mason, was the only other type represented at the finish, were always more noisy. Aside from motors built by the car manufacturers themselves there were four Rutenber and one Beaver motors represented. Most of the transmissions were those made by the Warner Gear Company, and had roller bearings. On the Chalmers, No. 52, and on one of the Moline cars the roller bearings worked loose, the retaining rings in each case loosening up and causing the trouble. On two or three axles the housing that supports the pinion bearing of the bevel gears worked loose and had to be tightened. On some axles this only necessitated the screwing of the housing back into place, but on others the cap screws which had worked loose had to be tightened or replaced.

#### TECHNICAL PENALTIES AND FINAL SCORES.

			Technical	Road
No.	9, Pierce-Arrow; Driver, W. S. Winchester	Perfec	Penalty. t score.	Score.
No.	108, Pierce-Arrow; Driver, J. S. Williams		t score.	0
140.	101, Moline; Driver, J. A. Wicke.  One new bolt in step hanger; time, 1 minute	0.1		
	Material, 10 cents	0.2		
	Tightening 8 spring clips; time, 11/4 minutes	0.2		
	Repairing cap screw on oiler base; time, 6 minutes	0.6	1.1	0
No.	2, Premier; Driver, Harry Hammond.			•
	One broken spring clip; time, 7 minutes	0.7		
	Material, 30 cents  Put on fan belt; time, 2½ minutes	0.3 0.3		
	Put on fan belt; time, % minute	0.1		
	One link for fan belt; material, 5 cents	0.1		
No	8, Pierce-Arrow; Driver, F. S. Dey.		1.5	0
110.	Straightening starting crank and adding new handle; time, 3 min.	0.8		
	Material, 60 cents	1.2		
	Repairing hinge on bonnet; time, 2 seconds	0.1		
No	114, Lexington; Driver, J. C. Moore.		1.6	U
110.	Tightening distance rod; time, 2 minutes	0.2		
	Tightening pinion shaft bearing housing; time, 7 minutes;			
	no material	0.7		
	Tightening right spring clip; time, 1 minute	0.1 0.6		
	Tightening water connection on pipe to carburetor; time, 1 min.	0.1	1	
	Repairing commutator rod connection; time, 1 minute	0.1		
		—	1.8	2.0
No.	5, Marmon; Driver, Howard Marmon. Tightening cross steering rods, right hand end; time, 15 min.	1.5		
	Material, new bolt, 10 cents	0.2		
	Replacing a spring leaf; cost outside of material, 80 cents	0.6		
	Time, 80 minutes	8.0		
	Straightening left rear spring leaf hanger; time, 20 minutes	2.0	7.8	0
No.	100, Moline; Driver, C. H. Van Dervoort,		•••	•
	Oiler driving mechanism; time, 50 minutes	5.0		
	Material, 20 cents	0.2		
N.	100 Bianca Among Dainer Charles Seefuld		5.2	8.1
140.	109, Pierce-Arrow; Driver, Charles Scofield.  Tightening steering drop arm; time, 7 minutes	0.7		
	Tightening left front wheel bearing; time, 5 minutes	0.5		
	1 spring clip; time, 7 minutes	0.7		
	Material, 80 cents	0.8		
	1 truss rod pin; time, 1 minute	0.1 0.2		
	Tool box bracket and tail light; time, 80 minutes	8.0		
	Material, 60 cents for bracket and \$3.50 for tail light	4.7		
NT -	4 Manage Diver Paral P Miles		10.2	0
No.	4, Marmon; Driver, Frank E. Wing.  Bottom leaf front spring broken; time, 10 minutes	1.0		
	Spring, 1 pound stock, 28 cents	0.6		
	1 step hanger broken	0.4		
	Material, 20 cents; time, 5 minutes	0.5	0.5	
No	6, Maxwell; Driver, E. G. Gager.		2.5	8
110.	Tighten steering column anchor bolts; time, 4 minutes	0.4		
	Tightening right front wheel bearing; time, 4 minutes	0.4		
	Truss rod loose; time, 10 minutes	1.0		
	Material, 20 cents	0.2 2.0		
	Material, 20 cents	0.4		
	Tightening magneto advance rod; time, 2 minutes	0.2		
M-	1 December Daines Web Ten		4.6	8.5
140.	1, Premier; Driver, Webb Jay. Tightening left rear wheel; time, 2 minutes	0.2		
	Tightening front spring clip; time, 2 minutes	0.2		
	Replacing broken spring clip; time, 7 minutes; material, 30 cts.	1.0		
	Tightening right front and left rear engine bolts; time, 1½ min.	0.2		
	Fan belt tightened and replaced; time, 1 minute	0.1 0.4		
	Vent pipe cover lost; time, 1 minute	0.1		
	Material, 10 cents	0.2		
	Rear spring, upper quarter: material, \$4.25	8.5		
	Thirt, OV minutes	6.0	16.9	0
No.	52, Chalmers-Detroit; Driver, Jean Bemb.			-
	Tightening left rear fender iron; time, 11/4 minutes	0.2		
	Tightening bevel gear pinion housing; time, 3 minutes, 21/2	0.0		
	minutes and 2½ minutes	0.9 0.1		
	Replacing screw on bonnet ledge: time, 1 minute	0.1		
	Material, 20 cents	0.2		

19.8

46.6

1.4

49.4

Road

Score.

4.8

16.1

Total

Score.

No. 5	3, Chalmers-Detroit—Continued.		Technical Penalty.
T N R	Tightening motor foundation bolts; time, 4½ min. and 2½ min.  Naterial, \$4.30	0.7 4.5 8.6 0.5 0.2 1.8	
W- 1	e Midland, Driver E O Have		17.8
	3, Midland; Driver, E. O. Hays.		
H	Replaced or repaired right rear wheel; time, 4½ minutes  Material, \$7.50	0.5 15.0	
R	Replaced broken starting crank; time, 9 minutes	0.9	
	Material, \$1	2.0	
F	Replaced both front fender irons; time, 1 hour 80 minutes	9.0	
7	Material, 70 cents	1.4 0.1	
	Sightening brake anchors; time, 20 minutes	2.0	
	Right front and left rear engine bolts tightened; time, 2 min.	0.2	
	Gasoline pipe bracket loose, 1 bolt replaced; time, 1 minute  Material, 5 cents	0.1 0.1	
	<b>,</b>		81.8
	53, Premier; Driver, Cliff Waltman.		
1	spring clip for front spring; time, 7 minutes	0.7 0.8	
F	Repairing leak in radiator; time, 1 hour	6.0	
1	lightening engine foundation bolts; time, 1 minute 80 seconds.	0.2	
1	Sightening water pump stuffing box; time, 10 minutes	1.0	
No. 1	07, Maxwell; Driver, C. E. Goldthwaite.		8.2
7	Tightening right front wheel; time, 9 minutes	0.2	
	Sightening right front dust cap; time, 1 minute	0.1	
	Finion housing loose; time, 2 minutes	0. <b>2</b> 0.1	
	Material, 10 cents	0.2	
F	Replacing right front spring saddle; time, 10 minutes	1.0	
(	Material, \$1.60	3.2 3.0	
	Material, 20 cents	0.2	•
¥- 1	4 White Driver H N Coroles		8.2
	14, White; Driver, H. N. Searles.  (lightening steering gear; time, 18 minutes	1.8	
	lightening tire iron brackets; time, 4 minutes	0.4	
	Tightening left rear fender; time, 40 seconds	0.1	
7	Taking off drain pipe to heater and thread cut thereon; time, 7 minutes	0.7	
	Outside labor, 5 cents	0.2	
	Adjusting right front wheel bearing; time, 7 minutes	0.7	
	Left fender tightened; time, 1 minute	0.1 0.1	
•	Material, 20 cents	0.4	
1	screw replaced and 1 screw loose on overflow pipe; time, 1 min.	0.1	
	Material, 20 cents	0.2 0.1	
•	Material, 20 cents	0.1	
1	Right fender bracket replaced; time, 5 minutes	0.5	
,	Material, 20 cents	0.2 4.5	
	Material, \$5.40		
1	Lamp bracket missing; time, 5 minutes	0.5	
	Material, \$2 Crank case oiler tube; time, 5 minutes	4.0	
	Material, 30 cents	0.6	
M-	AAA MARANA Diran MARANA CARANA		26.2
	102, Moline: Driver, W. S. Gregory.		
,	Outside brake band guides replaced; time, 20 minutes  Material, 20 cents	2.0 0.4	
	Tightening set screw on transmission bearing; time, 8 minutes.	0.8	
•	Tightening lock nut on jack shaft bearing; time, 80 seconds	0.1	• •
No.	51, American Simplex; Driver, Walter A. Woods.		2.8
	Repairing radiator; time, 8 hours		
	2 broken spring clips; time, 20 minutes	8.0 0.8	
			50.8
	111, Jewel; Driver, A. B. Uhl.	• •	
	Remaking 2 rear wheels; time, 10 minutes	1.0 12.0	
	I new cross spring; time, 1 hour	6.0	
	Material, \$3.80	5.6	
	I new front spring; time, 1 hour	6.0 5.6	
	Right rear spring clip tightened; time, 4 minutes	0.4	
	Left rear spring clips tightened; time, 4 minutes	0.4	
	Adjusting main pinion in case bearing; time, 4 minutes  Replacing brake brace bolt; time, 1 minute	0.4 0.1	
	Material, 10 cents	0.2	

Motor and transmission bolts had to be tightened on several cars. They were not off, as in each case castellated nuts were provided. The noticeable thing, however, was that the left hand ones on the transmission were loose, showing that perhaps the torque reaction was the cause of the loosening. On the motors it was always the right front and left rear bolts that were loose, which was evidently due to the effect of torque couples.

Springs in several cases were broken, and in some instance had a decided set. Some of the cars which had broken springs were Premiers, Nos. 1 and 53; Jewel, No. 111; Marmons, Nos. 4 and 5; White, No. 14; Glide, No. 10, and Maxwells, Nos. 107 and 6. The two Premiers broke the upper half of the three-quarter elliptic springs at the frame support. The Jewel broke a front spring and also the cross member of the platform spring in the rear. One front spring on the White was broken at the spring seat, and the other had a bad set in it. The Marmons both had a front spring leaf broken, and in each case it was on the driver's side. Their springs, by the way, were the lightest on the tour. The Maxwells and the Glide had broken springs, but the real cause of their trouble was that the spring seats were broken off the axle. This is a good point for the integral spring seats, which gave no trouble at all during the tour.

Probably the most chronic trouble on the whole tour was the breakage or loosening up of spring clips. There was scarcely a car which was not penalized for doing some work repairing trouble of this kind. So frequent was the trouble that the committee made a fixed penalty for this, namely, 30 cents charge for a new one and seven minutes penalty for replacing it; thus giving I point penalty in each case. For tightening them up two minutes were allowed for each clip. Those who desired to do the work could have their time taken, and in the case of the Mason two clips were tightened in one minute, whereas four minutes would have been charged if the work had not actually been done in less time. Several faint hearts did not dare do the work for fear that they might exceed the time set by the committee, and so be penalized more. Those who did work had the satisfaction of gaining less penalty.

#### Some of the Replacements.

Some surprisingly quick repairs were made on the cars where the work was done. Probably the quickest was on the Midland, No. 12, where the committee allowed thirty minutes' time for the replacement of a rear wheel. The actual time required for the replacement was exactly four and a half minutes. This is an excellent illustration of the ease with which a wheel can be removed from a Timken

Another of these quick repairs was on the Pierce, No. 8, which had to replace a

	Technical	Road	Total
No. 111, Jewel-Continued.	Penalty.	Score.	Score.
Rear transmission bearing tightened; time, 3 minutes 0.3			
Adjusting transmission bearings; time, 6 minutes 0.6			
Left radiator bracket cracked; time, 2 hours 80 minutes 15.0			
Material, \$1 2.0			
Leak in gasoline line; time, 1 hour 6.0			
Straightening front horns; time, 1 hour 6.0			
Material, \$1 3.0			
	69.6	87.9	107.5
No. 112, Mason; Driver, Rey Snyder.	33.73		
Replacing cotter pins in chain, 59 missing; time, 21 minutes 2.1			
Material, 20 cents			
Tightening 2 front spring clips; time, 1 minute 0.1			
Repairing leak in radiator; material 10 cents			
Time, 1 hour			
Replaced 1 new lamp bracket; material, 40 cents 0.8			
Labor on same, 10 minutes 1.0			
Labor on same, to minutes	10.8	844.5	844.8
No. 7, Jewel; Driver, O. P. Bernhart.	10.8	011.0	911.0
Repairing spring clips on front axle and replacing; time, 26 min. 2.6			
Time, 20 minutes putting on clip			
Work on left rear wheel; time, 5 minutes			
Material, \$8			
Tightening torsion rod; time, 5 minutes			
Tightening differential pinion shaft housing; time, 3 minutes. 0.8			
1 rear spring clip tightened; time, 8 minutes 0.8			
New side frame member; time, 2 men, 24 hours			
Material, \$30 60.0			
2 radiator brackets; time, 5 hours			
Material, \$3 4.0			
<del></del>	894.8	11.2	406.
No. 10, Glide; Driver, A. Y. Bartholomew.			
I bonnet catch replaced; material, 10 cents 0.2			
Tightening set screw on radiator; time, 1 minute 0.1			
Tightening step bracket; time, 15 minutes 1.5			
Material, 10 cents 0.2			
Spring clips; time, 15 minutes 1.5			
Material, 40 cents 0.8			
Riveting spring clips in place; time, 15 minutes 1.5			
Material, 20 cents 0.4			
<del></del> -	6.7	682.8	688.9

starting crank hand grip. Three minutes only were required. On the other hand, probably the most unique and unexpected repair to be made was on the Mason. This was the only car on the tour with a centre chain drive. The chain, when examined, was found to be minus fifty-nine cotter very well. Only the Lexington and the

pins. The surprising point is that in many cases there was absolutely nothing to hold the links in place, as both pins would be gone on the same link.

Despite the bad roads and broken springs the shock absorbers stood the punishment

FINAL SCOP	RES.	
GLIDDEN TROPHY	CONTEST.	
Car No. Name.	Road Score.	Final Score
9Pierce.	Perfect.	Perfect.
2Premier.	Perfect.	1.5
8Pierce.	Perfect.	1.6
5	Perfect.	7.3
4	8.	10.5
6	8.5	13.1
1Premier.	Perfect.	16.9
12 Midland.	4.3	35.6
14White.	19.3	45.5
7Jewel.	11.2	406.0
10	682.8	688.9
11Thomas.	Withdrawn.	1001.0
3Chaimers-Detroit.	Withdrawn.	1225.5
HOWER TROPHY	ONTEST.	
108Plerce.	Perfect.	Perfect.
101 Moline.	Perfect.	1.1
114Lexington.	2.	3.8
100Moline,	3.1	8.3
109Pierce,	Perfect.	10.2
107 Maxwell.	35.4	43.6
102 Moline.	46.6	49.4
111Jewel.	37.9	107.5
112 Mason.	334.5	344.8
103 Brush.	Withdrawn.	1005.6
106 Hupmobile.	Withdrawn.	1358.0
110McIntyre.	Withdrawn,	. 1452.7
104 Brush.	Withdrawn.	2251.6
105Chalmers-Detroit.	Disqualified.	
DETROIT TROPHY CO	NTEST.	
52 Chalmers-Detroit.	.6	18.4
53Premier.	16.1	34.3
51American Simplex.	1.4	52.2

Jewel, No. 111, were noticed with broken absorbers. It was the writer's experience the cars with shock absorbers could more easily keep up to schedule, as they did not fatigue the driver and "pound themselves to pieces" to the same extent as the others did. The cars employing wrapped springs and straps were notably bad riding. However, three of the cars having shock absorbers broke their springs. All the other springs which broke were wrapped and strapped. The Jewel, No. 111, and both the Marmons, Nos. 4 and 5, had broken springs, although they equipped with shock absorbers.

Probably no previous tour has been so severe on the wheels. The constant chucking against the deep ruts in which the prairies abound early started the spokes, and before the run was completed there were several cars in which observers were hesitant about riding. The lateral thrusts had worked the spokes so loose that by gripping the tires one could rock the periphery of the wheel fully 2 inches out of its normal position. Three cars had this trouble, and one of them had it in both wheels. Tightening the bolts did very little toward removing the trouble. One of the drivers attributed this to the very dry weather which we had, but wheels should be made of wood which is fully seasoned and will not give trouble, despite weather conditions.

With the cars well geared down, as was the general practice, the motor vibration at high engine speeds, as well as the road vibrations, seemed to play havoc with all but the most substantially supported lamp brackets. Within the first few days out of Detroit the cross support rods between the lamps began to break. Throughout the tour this trouble was prevalent. Not only did these rods break, but the brackets went soon afterward. One only had to watch the large headlights on the rough roads for a few moments to appreciate how hard the heavy lamps can vibrate. The broken frame on the Jewel, No. 7, can be attributed to this very cause in a large measure.

#### CONTROL OF THE CARS.

The absence of accelerator pedals on the most prominent cars was noticeable. Neither the Pierces nor the Premiers had them. The manufacturers of both cars state that the accelerator pedal in the hands of a novice is only an instrument with which to abuse the motor and so they do not supply cars with it. All cars had both spark and throttle control by hand levers. Only the Maxwells used the progressive type of sliding gear, the remainder having a three or four speed selective. Except for the Thomas, Mason and Brushes, all had shaft drive, and the tour therefore was practically a complete victory for the shaft drive.

One arrangement which would have been much appreciated by the tourists is means for changing the setting of the carburetor (Continued on page 131.)

## NEW VEHICLES

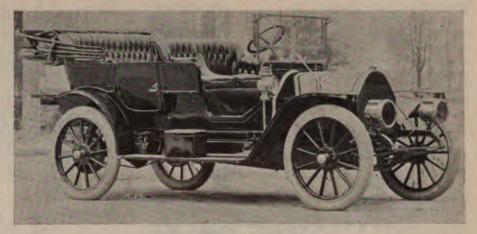


The New Reo Four Cylinder Car.

The Reo Motor Car Company, of Lansing, Mich., have this year for the first time added a four cylinder car to their line. It is a five passenger touring car, rated at 30-35 horse power and selling at

The motor has water cooled cylinders cast in pairs, of 4 inch bore by 4½ inch stroke. The cylinder castings are made of close grained cylinder iron. The crank case is of the barrel type with bolted on circular end plates. Two hand hole covers are provided at one side of the crank case, which when removed permit of readily adjusting the connecting rod bearings. The main bearings of the crank shaft are adjustable from outside the crank case, and easy adjustment of the crank and connecting rod bearings is one of the special features claimed for the new motor.

The crank shaft is of manganese steel having a tensile strength of 110,000 pounds per square inch. All crank bearings are of 11/2 inch diameter, the pin bearings being 21/4 inches long, and the combined length of the main crank bearings 101/2 inches. The crank shaft is offset from the centre line of the cylinders, as is also the cam shaft from the centre line of the valve plungers. The cam shaft is of large diameter, running in three bronze bearings, and is easily removed. The cam gears are provided with helical teeth in order to insure noiseless operation, and operate in an oil bath, which is constantly replenished by the engine lubricating system.



REO 1910 FOUR CYLINDER CAR.

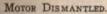
The oiling system is of the pump circulated splash type. A single, large plunger pump is driven from the cam shaft through an eccentric. It delivers oil from the oil reservoir to the three main bearings of the motor, and also to the face of the cam gears. This oil then collects in partition reservoirs in the bottom of the crank case, and is maintained at a constant level. The connecting rods dipping into this oil cause a fine spray which lubricates the cylinders and pistons, the amount reaching the cylinders being governed by splash plates.

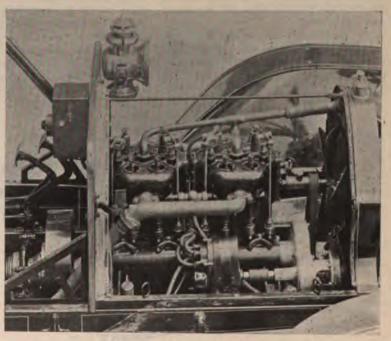
The chief feature of this oiling system is its simplicity. There are no outside pipes or connections, no pump stuffing boxes or driving gears, and no adjustment is required after the motor leaves the factory. The oil circulating pump is claimed to be self-cleaning, for instead of drawing all the particles of lint and dirt into the protecting screen, by steady suction, as would a gear pump, for instance, the screen is kept clean by the pump discharging at least one-half of its

capacity against the screen at each stroke. Instead of carrying a large oil reservoir containing 2 or 3 gallons, a 3 quart reservoir is provided, and thus the trouble arising from a large amount of lubricating oil becoming dirty and full of carbon deposits is eliminated. The system requires the addition of oil every 250 or 300 miles, and this is claimed to be far preferable to carrying a large quantity of oil and renewing it less frequently.

Particular attention has been paid in the design to making the motor oil-tight. The outside main bearings, as well as the bearings of the magneto and pump shafts, have return oil leads. The valve plunger guides have recesses at the top for collecting oil and returning it to the crank case, and are also provided with carefully fitted protecting caps to keep the dirt out and the oil in. There is only a single grease cup on the motor, and that lubricates the fan bearing. The valve lifters are adjustable, and have hard fibre inserts to deaden the noise. The valves are of large diameter, bevel seat-



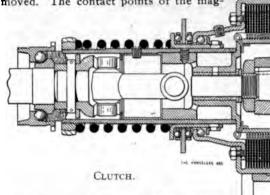




MOTOR ASSEMBLED ON FRAME.

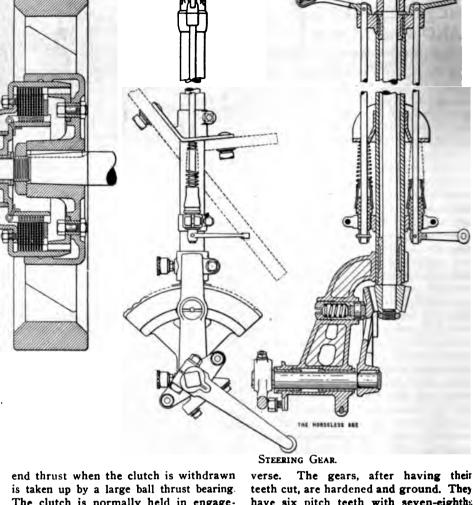
ed, and of the combination nickel steel head and carbon steel stem type.

An automatic float feed carburetor is used which is claimed to admit of a wide range of speed. Ignition is by magneto, with a battery auxiliary for starting. The magneto is attached to its bracket by a single strap and may be quickly removed. The contact points of the mag-



neto are very accessible, and the wiring is short and fully protected. The magneto is connected to its driving shaft by a universal joint packed in grease, and its driving gear runs in oil inside the cam gear casing. The gasoline tank is located under the front seat. It is securely riveted and supported by bands passing around it, instead of by lugs riveted to the bottom. The tank has a capacity of 15 gallons. The cooling water is circulated by means of a centrifugal pump driven from the magneto shaft and accessibly located. The radiator is of the vertical flat tube type and of the same construcstruction as used in former Reo models. It is claimed that it can be easily repaired without spoiling the finish of the outside casing. Back of the radiator is mounted a fan driven by a seven-eighths of an inch flat belt, with a convenient and positive adjustment. The fan runs on ball bearings. The flywheel spokes are also of fan shape and assist in the circulation of air through the radiator and the space under the hood.

The clutch is of the multiple disc type, consisting of alternate discs of hardened steel and phosphor bronze. The steel discs are ground after hardening. The

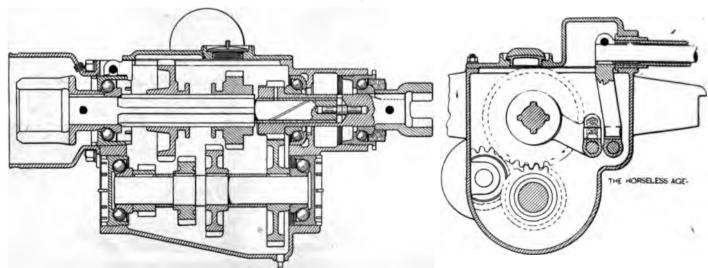


end thrust when the clutch is withdrawn is taken up by a large ball thrust bearing. The clutch is normally held in engagement by a single spring whose tension can be readily adjusted. It is claimed to have positive release, the plates being positively dragged apart by the opening of the clutch.

The clutch is connected to the change speed gear through a double universal joint which is completely encased and packed in grease. This joint is of the full universal type and not the ordinary square shaft with loose sleeve. The change gear is of the selective type and gives three forward speeds besides a re-

verse. The gears, after having their teeth cut, are hardened and ground. They have six pitch teeth with seven-eighths of an inch face. All shafts are hardened and ground, and the sliding pinions are carried on a shaft having four feather keys formed integral with it. The gear case is made in a single casting with removable bearings and a large detachable cover. Except for the shafts of the reverse pinion and pocket gear, all shafts run in ball bearings. All shifting rods and connections are enclosed, and special attention has been given to secure an oil-tight casing.

The rear axle is of the shaft driven



Two Sectional Views of Change Gear.



REAR AXLE WITH BRAKES.

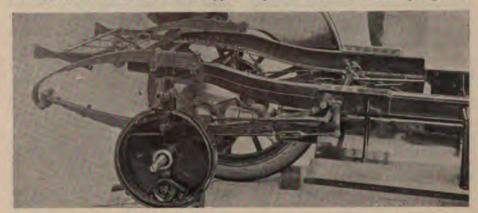
oating type; the bevel driving have five pitch teeth and are after hardening. The standard atio is 31/2 to 1, the pinion and aving sixteen and fifty-six teeth reely. The gear shafts are mounted ustable ball bearings, while the ends of the axles are equipped with bearings, the rollers running in teel sleeves inserted in the axle The compensating gear is of the inion type. The driving gears can usted to the proper mesh by rethe cover of the axle housing and ing the adjusting rings. The torthe bearings are adjusted from the

ngle universal joint is used in the seed drive and is enclosed in a spherical casing forming the forward end torsion tube. The spherical porf this casing is enclosed in a split ring sliding in a pressed steel bolted to the gear case. In this universal connection between the ase and the torison tube is secured. niversal joint is always packed in int, which is fed to it from the gear The torsion tube is a steel tube entitled the driving shaft concentrically.

The latter is of 3½ per cent. nickel steel, heat treated, and runs in adjustable ball bearings.

The car is equipped with two sets of brakes, of the external and internal type one piece drop forging, made of manganese steel and heat treated. The spring seats are forged integral with the axle. The steering spindles are set to make the car self steering, the steering wheels always tending to keep in the straight ahead position. All the bearings of the steering connections have bronze bushings and hardened pins, and grease cups are provided for all wearing surfaces. All steering connections are carried above the axle.

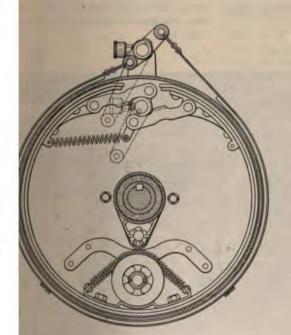
The frame is of pressed steel, hot riveted and carefully braced. The motor and change gear are supported on a dropped sub-frame, which is carried at a slight angle to the main frame, so as to secure a straight line drive. The frame is carried on semi-elliptic springs in front and three-quarter elliptics in the rear, and is "sprung" over

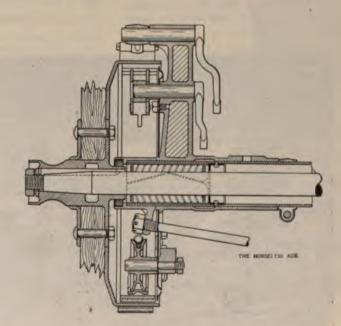


REAR PORTION OF FRAME.

respectively, both acting on the same set of drums, which are 14 inches in diameter and secured to the rear wheel hubs. It is claimed that no strain comes on the driving shaft, axles, torsion tubes or gears as a result of the application of the brakes. The front axle is an I section,

the rear axle to give a large spring clearance and allow the car to carry low. The wheels are of the artillery type; they have twelve spokes each and are 34 inches in diameter. Three and one-half inch Michelin quick detachable tires are fitted. The wheel base is 108 inches and the tread is stand-





HUB BRAKE.

ard, it being claimed that the car will run in ordinary wagon tracks without chafing the tires.

Sheet steel dust plates are fitted between the sub-frame and the side members of the main frame, and a single piece pressed steel under hood is fastened to the subframe by eight locknuts. The car has a clearance of 12 inches under the front axle. which is the lowest part, and of 121/2 inches under the flywheel when loaded. The steering gear comprises a bevel pinion and sector, and is claimed to entirely eliminate back lash. There is only one adjustment, and that is easily accessible. The steering wheel is 16 inches in diameter, and comprises a hard rubber rim on an aluminum spider. The rim has molded finger grips, and is claimed not to wear off or get sticky. The starting crank has four points of engagement on the motor shaft to make starting easy, and is locked in a vertical position by a spring check when not in use.

A departure has been made from conventional practice in the arrangement of the control members. The controlling levers and steering post are located on the left hand side. The change gear is operated selectively by means of a swinging lever, which is claimed to lock absolutely when in the neutral position. The emergency brake lever is located outside the gear lever and operates the internal brakes on the rear wheel hubs, at the same time disengaging the clutch. There are two foot levers, the right one controlling the external brakes on the rear wheel hubs, and the left one controlling the clutch. An additional small foot lever serves to operate the muffler cut-out. Spark and throttle levers are located on the steering post.

The body is designed to comfortably carry five passengers. The tonneau seat is 40 inches wide inside the upholstering at the cushion line, and the front seat 40 inches. The front seat is semi-divided, giving both the driver and passenger ample

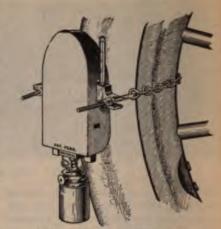
elbow room. The body is finished in blue black, striped with light blue, and is fitted/ with mahogany trimmings and door panels.

The Keystone Light Six.

The Munch-Allen Motor Car Company, of DuBois, Pa., have brought out a small six cylinder car, deliveries on which are to begin next fall. The cylinder bore is 3% inches and the stroke 4% inches, which would make the horse power, according to A. L. A. M. rating, 30. The cylinders are cast in pairs with the valves in the head and operated by push rods on the inlet side. The motor is oiled by a positive gear driven pump inside the crank case, with leads to all crank shafts, connecting rod and cylinder bearings. A film tube radiator is employed and a ball bearing fan is mounted back of it. The cooling water is circulated by means of a gear driven pump. Ignition is by jump spark, and an option is given on two makes of American magnetos. A standard carburetor is supplied.

The motor and change gear are built into a single unit, which is supported at three points. The crank chamber of the motor has sidewardly extending arms at its forward end which rest on the side frames, while the rear end of the gear case is supported by a dropped cross member of the frame. A multiple disc clutch comprising twenty discs connects the motor with the sliding pinion change gear which affords three forward changes of speed and one reverse speed on the selective principle. The drive to the rear axle is by an enclosed propeller shaft, 13% inches in diameter, which is provided with a single universal joint at its forward end. The steering gear is of the worm and worm wheel type, mounted on ball bearings. The hand wheel is 17 inches in diameter and is surmounted by the finger levers for the throttle and spark, which move over a stationary quad-

The car is provided with a two or three



NATIONAL STEAM VULCANIZER.

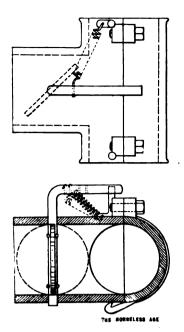
passenger roadster, four passenger baby tonneau or five passenger touring body. The equipment includes a 10 inch searchlight and generator, three oil lamps, dragon horn, tools in roll, jack, pump and tire repair outfit. The weight of the car without top and supplies is given as 1,935 pounds. In addition to this Light Six the Munch-Allen Company has been manufacturing for some time a six cylinder, 60 horse power car, which, with Bosch magneto, 122 inch wheel base, and 36x34 inch tires, sells at \$2,250. The price of the Light Six is \$2,000.

#### The National Steam Vulcanizer.

The National Motor Supply Company, of Cleveland, O., have just placed on the market a new steam vulcanizer which is adapt ed for both owners' and garage use. It is constructed with a brass shell which is to be filled one-third full of water. The heat is supplied by means of an alcohol torch with an adjustable burner. The National has a vulcanizing surface of 3 by 5½ inches, and is adapted for either tube or casing work. It can be used at home or on the road. A complete outfit is sold, packed in a small box.



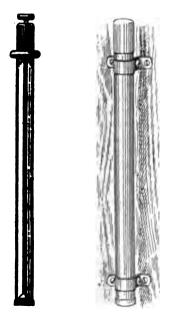
THE KEYSTONE LIGHT SIX.



STRYKER MUFFLER CUT-OUT.

#### The Stryker Muffler Cut-Out.

This device has been designed and is manufactured by C. W. Stryker, of Syracuse, N. Y. It is to be attached to the exhaust pipe, between the motor and the muffler. It consists of two malleable iron castings which fit the outside of the exhaust pipe with a gas tight fit when clamped in place over a hole in the pipe which should be equal to the inside diameter. The castings form a tee, one section of which has a butterfly valve operated by a lever to which a spring is attached to keep the valve normally closed and thus cause the exhaust to enter the muffler. The cutout serves to strengthen the exhaust pipe where it is attached and the arrangement of the castings with two hooked projections on one side and two lugs for cap screws on the opposite side provides an efficient and



STRAIGHTLINE GASOLINE GAUGE.

simple means of attachment. The cut-out is made for I, 11/4, 11/2 and 2 inch iron pipe and tubing ranging from 11/4 to 21/2 inch outside diameter by increments of 1/8 inch. The manufacturer claims the following advantages: It is easily and quickly attached, it being unnecessary to cut or disturb the exhaust pipe to do so; being fitted with a butterfly valve, carbon or mud will not prevent it from closing properly; the outlet passage being larger than the inside diameter of the exhaust pipe, there is practically no back pressure; the stops regulate the proper opened and closed positions of the valve and the spring operating the valve is sufficiently removed from

Mr. Stryker also manufactures a pedal for operating the cut-out.

the heat so as not to be affected by it.

#### The Straightline Gasoline Gauge.

This device consists of a heavy, annealed glass tube, having a valve at the lower end operated by a plunger running through to the upper end of the tube. The method of using is obvious. The tube is inserted into the tank, the plunger is depressed, and when the liquid has risen to its full height in the tube the plunger is released, whereupon the valve automatically closes. The tube is then withdrawn and the gasoline depth is indicated by a mirrorlike surface, which is claimed to be visible in the faintest light. A metal carrying case is provided, which may be attached by brackets to the dash or other part of the car.

The manufacturers, the P. R. Manufacturing Company, 621 Belleview avenue, Detroit, claim that this device is the result of a series of experiments in which a variety of principles were tried out and discarded.

## The "Aplco" Electric Vehicle Lighting System.

The Apple Electric Company, Dayton. Ohio, are now marketing their "Aplco" electric lighting system for automobiles, which comprises an automatically governed dynamo, a storage battery and a volt-ammeter. The dynamo embodies a distinct improvement over similar machines formerly used for the same purpose, which could not be positively driven from the motor, owing to the varying speed of the latter, but required a so called governor pulley, which slipped more or less to make up for variations in motor speed. The new Apple dynamo is driven positively from the motor and is controlled by a device known as a "load regulator," on which a patent is pending. This load regulator will hold the current output of the dynamo at any value for which it is adjusted, between 2 and 12

As soon as the dynamo generates sufficient voltage, an automatic cut-out connects the dynamo circuit through the volt-ammeter to a large capacity storage battery which



"APLCO" DYNAMO.

acts as a reservoir to accumulate the surplus current, and it supplies automatically the current for either the ignition or light at those times when the dynamo is under speed or at rest, and therefore not furnishing the necessary current.

The dynamo is mounted on ball bearings and has a rated capacity of 10 amperes. It is provided with a multiplier driver through which it is connected to the motor shaft, and weighs complete 24 pounds. The battery is of 6 volt, 100 ampere hour capacity.

The Apple Electric Company also supply silver plated parabolic reflectors for changing over gas headlights to electric headlights, fittings and bulbs for changing over oil side and tail lights to electric, and



ARTIZAN AUTOMATIC AIR SUPPLY OUTFIT. (See next page.)

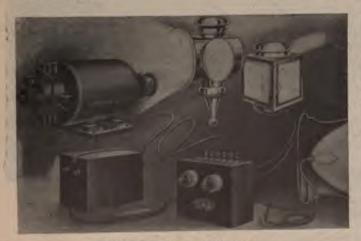
lamps designed for electric lighting only. The advantage of the latter is that they have no openings through which dirt can get into the lamp and spoil the reflecting power.

#### The Artizan Automatic Air Supply Outfit.

The Artizan Brass Company, of Chicago, is placing on the market an electrically driven, portable, compressed air outfit for inflating tires, cleaning cushions or any of the various uses to which a supply of compressed air lends itself. A 12x36 inch galvanized iron tank provides ample storage capacity, and the pressure is maintained by an automatic cut-out, which starts and stops the motor as the air consumption varies. Either alternating or direct current motors will be supplied, as ordered, and current can be taken from any incandescent lamp socket. The tank may be detached, fully charged, and is then available for use in roadside repairs.

#### The "Perfection" Lighting System.

Bishop, Delano & Co., 1463 Michigan avenue, Chicago, Ill., have brought out an equipment for furnishing electric light for automobiles, which is sold in various sets or combinations to meet the requirements in connection with different types of cars. In some of the sets a dynamo is used, and in others the current is furnished by means of a storage battery. Typical of the dynamo sets is the set No. 1, which is adopted for limousine cars. It comprises a dynamo which is either belted, gear or chain connected to the engine, a controlling box and switches. The dynamo furnishes current at 12 volts, being self regulating, electrically, so as to generate current at practically constant voltage independent of the speed of the engine. The outfit furnishes current both for ignition and for lighting two headlights of 32-40 candle power to pillar lamps, two side lamps, one tail lamp, three dome or interior lamps, one trouble lamp and one gauge light. All the lamps are 12 volt tungsten lamps, and sufficient current is generated to furnish 110 candle power at the same time.



PERFECTION LIGHTING SYSTEM.

#### U. S. Standard Machine Screws

By JOSEPH A. ANGLADA

	Th'ds	DI	IAM.		DRII	LLS			LE	HS				
No.	per		Bottom	Clea	rance	Tap		F	lat	Round	Fillister			
	· · · ·	Body	of Thread	Close	haz Full	% Th'd	Full	Diam.	Thick	Diam. Thi	ck Diam. Thick	M'n	Max	
2	56	.0842	.0582	44	32	58	51	.1631	.0505	.1544	.1332	350	36	
8	48	.0973	.0612	40	30	45	47	.1894	.0589	.1786	.1545	1/10	34	
4	32	.1105	.0564	34	28	66	46	.2158	.0674	.2028	.1747	954	34	
	36		.0624			48	44							
	40		.0672			42	44							
5	32	.1236	.0695	80	23	39	42	.2121	.0758	.2270	.1985	Tie	76	1
	36		.0755			37	41							a In
	40	- 4	.0803			37	39							2
6	30	.13 8	.0791	28	18	34	87	.2684	.0842	.2512	.2175	750	1	q u
	32		.0827			33	36							1 9
7	30	.1500	.0922	24	14	30	31	.2947	.0026	.2754	2892	36	135	to the in by Use
	32		.0958			30	31							
8	30	.1631	.1054	19	10	29	29	_3210	.1011	.2006	.2610	34	1%	16 to.
	32		1090			28	29							
.9	24	1763	.1041	16	4	27	29	.3473	.1094	.3238	.2805	36	135	
	30		.1186			24	27							
	32		.1222			24	26							
10	24	.1894	.1173	11	2	.21	25	.3736	.1179	.3480	.3035	36	135	In.
	30		.1317			19	22							120
	32		.1353			19	21							by
12	20	.2158	.1292	2	34	16	19	4263	.1347	.3922	.3445	76	13%	H
	24		.1436			13	16							X
14	20	.2421	.1555	34	The.	6	10	.4789	.1516	.4364	.3885	36	2	1. 19
	24		.1699			4	7							6 10.
16	16	2684	.1602	962	1964	9	4	.5315	.1684	:4806	.4300	96	2%	136
	18		.1722			1	3							
	20		.1818			1	2							
18	16	.2947	.1865	1964	21/04	34	15/64	.5842	.1858	.5248	.4710	36	256	
	18		.1985			1/4	3/4							
20	16	.3210	.2128	21/64	23/64	960	176a	.6368	2021	.5690	.5200	36	23%	
	18		2248			962	1764							100
22	16	.8474	.2391	23/64	3%	1964	1964	.6894	.2189	.6106	.5557	36	3	by M
	18		.2511			610	1964							4 .
24	14	.3737	.2500	76	19/12	950	910	.7421	.2358	.6552	.6005	36	2	2 30
	16		_2654			21/04	5/10							0 15
26	14	.4000	.,2763	13/82	310	13/82	23/64	7947	. 2526	.6938	.6425	3%	3	8 in. to 156 in.
	16		,2918			2364	11/32							8 10
28	14	4263	.3026	7/16	2964	96	23/64	.8473	.2694	.7854	.6020	26	3	
	16		.3181			7%	9%							
30	14	.4526	.3289	29/64	DAGA	14/12	2964	.8999	.2863	.7770	-7240	1	3	
	16.		.3444			13/52	25/64							

The set No. 2 is intended for large touring cars, and is substantially the same as set No. 1, except that it includes a smaller

dynamo and only 96 candle power can be obtained at one time. The set No. 3 is a 6 volt system for small touring cars, and comprises a dynamo, controlling box and switches. Where this set is applied it is intended that the owner's own storage battery shall be used for ignition. The battery sets, of which four are being offered, all comprise a 6 volt storage battery, in two sizes, an 80

ampere hour battery being furnished for larger cars and a 60 ampere hour battery for small cars. The batteries are to be used for lighting only. The company furnishes adapters for converting gas and oil lamps to electric lamps.

Albert Dahms, general storekeeper at Neenah, Wis., has purchased a high wheel delivery wagon. A delivery of goods to a point 9 miles from the store was made in thirty-five minutes last week.

The Capitol Lumber Company has the distinction of being the first concern of its kind in Indianapolis to use motor trucks, having purchased a 1½ ton gasoline truck. This truck is being used in the delivery of lumber and building materials, apparently with much success. The company contemplates increasing its motor delivery equipment if the present experiment proves satisfactory.

## Sixth Annual A. A. A. Relia-

(Continued from page 124.)

the dash. In many cases, especially the altitude changed rapidly, it was sary to have such an adjusting means did not wish to stop every 10 miles. Another important feature was the controlled feed of oil from the seat, which were not so equipped had to two or three times a day to oil up, rainst only one stop of the others, of the cars made the whole run witheplenishing the oil in the transmission rear axle cases.

Pierce cars did not put any water their radiators during the entire run, rews claim; on the other hand a numf cars had a chronic thirst and cars gallon cans of water. Running ut fan belts was in a measure responsion this. The Maxwell, No. 107, made tarkable demonstration in making the tour without the use of a fan belt, besides, as is well known, it uses the co-siphon system. On the hardest runs there was no evidence of overing on this car, as far as could be

official statements were made as to year's tour. By some it is thought here will be none. Mr. Glidden, how-stated that there would be a transconal run from San Francisco to either York or Boston. There are also other that it would be through the South atter route probably would have fully my advocates as the transcontinental If the South can be judged by Sah, the tourists certainly should give usideration.

#### Winners of the Trophies.

h the Glidden Trophy and the Hower
by were again won by Pierce cars,
the Chalmers-Detroit took the trophy
was donated by its home city, DePierce, No. 9, driven by W. S.
hester, was the winner of the GlidTrophy, and, as the appended table,
was the only car competing for
trophy having both a perfect road
echnical score. In the Hower Class
how to driven by J. S. Williams,
se had perfect road and technical
There were no perfect road or
cal scores in the Detroit Trophy

two winning Pierce cars were bed with Bosch magnetos and Goodtires. The Chalmers-Detroit, which the Detroit Trophy contest, was bed with Bosch magneto and Diatires.

y the Pierce cars, two Premiers, one on and one Moline had perfect road. The table on page 124 shows the of the cars following after the



PREMIER No. 1, PERFECT ROAD SCORE.

PROTESTS.

Although everything seemed to be going smoothly on the surface, underneath there was great dissatisfaction. Several parties said that Mr. Hower had "it in for them," and others said he was favoring someone else. The tour, therefore, did not end without considerable bitter feeling, and many of Mr. Hower's staunchest supporters deserted him.

Before leaving Kansas City it was made known that H. O. Smith and W. H. Vandervoort had protested the Pierces in the Glidden and Hower contests, respectively. The ground upon which the protest was made was that according to the rules the lamps of the cars should be in the same condition at the end of the tour as when the cars left Detroit. The Pierce, No. 108, had a smashed rear light and the Pierce, No. 9, had also a broken rear lamp. In addition No. 8 did not carry his lamp on the bracket for several days during the route after it had dropped off. For the present we will have to await the decision of the contest board.

The substance of the protest was as follows: Toward the middle of the tour one of the Pierce cars, No. 9, dropped and broke its rear lamp. For some time afterward the broken lamp was not carried in position. However, when it was deter-



MOLINE NO. 101, PERFECT ROAD SCORE.



CHALMERS, No. 52, WINNER OF DETROIT TROPHY.

mined that no penalty could be imposed for refastening it was replaced. The Pierce, No. 108, had its tail lamp telescoped, but the lamp was kept still in position. The protestants claim that the two cars should have been presented to the technical committee with the lamps in the same condition as when they left Detroit. In addition, the Premier Company claims that No. 9, Pierce, must, according to rules, have carried lamps during the whole tour, which it did not do for a short interval. On this ground the Premier protest the award of the prizes to the entrant of these cars. The protest was only filed, however, after the technical committee had made its report. The matter will come up before the contest board of the A. A. A. for de-

Another thing that will likely lead to complaints relates to the method of calculating the scores. Almost all the material replaced or assessed as such by the committee was for outside material. The time for labor required on all such material should have been doubly penalized, according to the rules. Clause (e) under penalties reads as follows:

(e) Time consumed in connection with such uninventoried parts and material: Two-tenths of a point for each minute or fraction thereof for each person.

In the official list of penalties as itemized in the following table this was not taken into account, as will be very evident. Only the material charges were doubled.

#### The Brighton Beach Twenty-four Hour Race.

The twenty-four hour racing tournament held at the Brighton Beach track Friday and Saturday, July 30 and 31, was won by a Simplex car, which covered 1,091 miles, thus leaving its last year's record unbroken by a margin of 86 miles. It was not necessary at any time during the race to surpass

it, and probably, in view of track conditions, any attempt to do so would have been unwise.

The contestants in the race, which was limited to cars costing over \$2,000, were as follows:

From the start at 9:05 Friday night the Fiat took the lead, which it held up to the end of the sixth round, when a collision with a fence post sprung an axle and slightly twisted the frame, inducing clutch troubles, which finally caused its withdrawal. The Haynes, which had troubles early in the race, was finally put out of the contest by a broken crank shaft. The Acme, whose troubles included a broken frame, retired in the twenty-second round. The Stearns received a setback early in the race through a broken steering knuckle, and in spite of strenuous efforts was unable to recover the lost ground. The Lozier had some trouble due to heating of a universal joint. All these misfortunes left the race to the Simplex, Rainier and Palmer-Singer cars, which kept throughout the race in the relative positions taken in the first round. The five cars which concluded the run made the following mileages: Simplex, 1,091; Rainier, 1,041; P. & S., 968; Stearns, 919; Lozier, 885. The winning Simplex car was fitted with Michelin tires and a Bosch magneto.

The police authorities stopped the race for an hour between 5 and 6 o'clock Saturday for the purpose of repairing the track, which had reached such a dangerous condition as to cause a protest by the drivers. No work on any of the cars was allowed while the rolling and sprinkling were going on.

#### Hints On the Care of Tires.

The following hints on the use of tires have been compiled by the experts of the Fisk Rubber Company, Chicopee Falls, Mass.:

Tire trouble can be classed roughly in three divisions, viz.: (1) Poor tires, (2) improper size, (3) abuse.

Of the first classification very little need be said. It is policy to buy the best regardless of price, from a reputable concern. That ought to eliminate this style of trouble.

As regards size of tires, this is one of the vital points. Air cushion is essential to the proper equipping of an automobile. It is not the thickness of the tire which counts, for a tire must have its various constructive elements in proper proportion. If thickness was the main issue, tires could be built in 4 inch sizes in the same thickness as 5 inch, but such a procedure would permit of the pulling apart and disintegrating of the tire, for it would be out of proportion. The air chamber and its size in relation to the rest of the tire have a great deal more to do with the proposition than most people imagine. One should not be afraid of getting too large a tire. That rarely happens.

It is also well to get the same size tires for both front and rear wheels, as it is far more convenient in long distance touring, when carrying extra tires of two different sizes is a burden. In event of having to replace a tire on a tour and having to buy same from a dealer, there is a much greater chance of his having one correct size in stock than two.

As for abuse of tires—the tire manufacturer gets blamed for many things that are caused by this offense. One of the commonest forms of tire abuse is lack of air pressure in tubes. Hardly one car in ten is driven around with the proper amount of air pressure in its tires. This is principally due to carelessness on the part of the driver, for if the motor is running properly the tires are overlooked until a flat one makes itself manifest.

Tires should be inflated approximately in accordance with the following table:

																											~				
Inches.																										۰			Po	uni	1s.
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= 1/4			u	ı			ı.		ı		ů,	ú	Į,	,				8		ı	u	ı	2	9			ü	ü	Re-	to.	100

A few "Don'ts" may be of value to those who wish to eliminate tire abuse. Here they are:

Don't slide your wheels by locking the brakes.

Don't go around corners on two wheels.

Don't let your clutch in suddenly so that
it "bites," causing discomfort to passengers
and injury to rear tires as well as motor.

Don't let your tires stand in oil or greasy spots.

And above all keep your tires well inflated.

#### GARAGE ITEMS



#### The Regal Garage, Detroit, Mich.

The Regal Motor Sales Company, of Detroit, was recently organized to distribute the Regal cars through the State. The company has erected the garage here illustrated and described to facilitate this work and for the convenience of Regal owners residing in the city.

The garage is located at the corner of Woodward and Alexandrine avenues, in the heart of the garage district, and close to a large residence section. The building is of brick, of the single entrance type, with 40 foot frontage and 176 foot depth. It is from the designs of Speir, Rohms & Gehrke, local architects, and is a good example of the smaller type of garage.

The showroom occupies the front of the building. It is well lighted by a window across the entire front, another at the side and a third opening on the driveway entrance. The room is panelled in Mission style and the ceiling and walls above the panelling are tinted. Mission furniture is used, and ferns and palms are employed for decoration. The floor is of mosaic, with the name "Regal" near the front, where it is noticed by anyone entering the door or looking in at the show window. A polished chassis and a car with coupé body are exhibited. The lighting for the main portion of the room is furnished by a cluster of incandescents at the centre. A "liner" light is placed above the show window for lighting the chassis. There is also a small display of lamps, speedometers and exhaust blown horns.

At the time of the writer's visit a large map of the route of the New York-San Francisco trip of the "Regal Plugger" was laid out on the front window. A picture of a car was moved along on this map from day to day, to show how fast the trip was completed. The side of the garage next the street is used for advertising purposes, a brilliant sign with full size picture of the car being painted thereon. This can be seen in the illustration.

The panelling between the showroom and the office contains clouded glass windows, which light the clerical and executive rooms. The office woodwork, walls and ceilings are finished to correspond with the showroom. The toilet rooms and coat closets open from the offices.

Sliding panelled doors between the showroom and the driveway permit show cars to be taken in and out. The stand for checking in and out is close beside the driveway, and the stockroom is next to it. The driveway ceiling is arched and is tinted the same color as the showroom, so the color effect is uniform to one looking in from the street.

The main room is lighted by eight double and one single windows on the sides, by



REGAL GARAGE, DETROIT.

windows in the rear wall and door, and by three large double skylights. Ventilation is provided by swinging shutters in the ends of the skylight monitors. The entrance is by a single sliding door at the front, and the exit is by a double swinging door opening on the alley at the rear.

The roof is nearly flat, and is supported by steel trusses. Artificial light is furnished by five gas arcs. Along the wall, about hip high, is a metal conduit, with sockets for incandescent lights about 25 feet apart. These sockets are used for attaching lights with flexible cords when washing or repairing.

The repair bench is in the rear right hand corner, and is fitted with vises and hand tools. All heavy repairing is done at the factory. At the rear left hand corner of the building a space is separated from the main room by a brick partition, and is divided into two parts. One is the wash and toilet room for the workmen, the other is the storage vault for oil and gasoline. The gasoline is stored in a 300 gallon tank underground, and is handled by the Snell hydraulic system. Oil is kept in barrels and in standard tanks.

Close beside the fuel vault is the wash rack, which is furnished with the usual swinging washer. Hot water is supplied by a Jewell gas heater and a 50 gallon tank. The building is steam heated from a central heating plant, which is close at hand. Floor radiators are used, set close to the side walls. Dry chemical fire extinguishers are used throughout. Air for inflating tires is supplied by an Allis-Chalmers electric driven compressor. The storage tank has a capacity of about 51/2 cubic feet. The air is piped to convenient points about the main room, which is a convenience that is generally much appreciated by patrons of a public garage.

## Papers to Be Read at Engineers' Meeting.

Following is a list of the papers which will be presented at the meeting of the Society of Automobile Engineers at Chicago on August 5, 6 and 7:

"Commercial Test of a Pierce Water Cooled Motor," by J. A. Luhrman and G. W. Woodward.

"Some Points in the Operation and Care of Vehicle Batteries," by H. M. Beck.

"The Wider Dissemination of Professional Knowledge and Experience," by Henry Hess.

"Possible Increases of the Weight Efficiency of Storage Batteries," by Edward Sokal, Ph. D.

"Notes on Lubricating Oil," by Frank H. Floyd.

"Energy Consumption of Commercial Vehicles," by Alex. Churchward.

"Electric Cradle Dynamometer-Method for Testing Gasoline Engines," by H. S. Baldwin

"Test of a Twenty Horse Power Franklin Air Cooled Motor," by L. R. Evans, M. E., and R. P. Lay, M. E.

#### Club Notes.

The Guilford County Motor Club was organized in Greenboro, N. C., on June 25, and the following officers were elected: Dr. J. T. J. Battle, president; F. N. Tate, of High Point, vice president; Ernest Clapp, secretary, and Dr. J. W. Long, treasurer.

An automobile club is to be organized at Waterloo, Ia., and a meeting for the purpose of organizing was called to be held at the Y. M. C. A. rooms on August 2 by a committee composed of F. A. Ferguson, G. E. Lichty and F. T. Hartman. It is said that there are between 200 and 300 automobiles owned in the city.

#### COMMUNICATIONS



## Improved Method of Balancing Single Cylinder Motors.

Editor Horseless Age:

I beg to take exception to your method of balancing a single cylinder engine, as given under the head of "Balancing of Engines" in your issue of June 16, 1909.

You say: "The proper method of balancing the moving parts of a motor is to place the crank journals on parallels, place the crank pin at the same height as the crank journals, extend the connecting rod horizontally away from the crank centre, and support the piston end of the connecting rod in this position by means of a string. Now drill the flywheels until the parts balance in this position. The method is illustrated in Fig. 2.—ED."

By this method you balance only the rotating mass (the crank pin and lower end of connecting rod) and make no attempt to counteract the vibrations set up by the reciprocating mass (the piston, wrist pin and upper end of connecting rod). At the mid-point of the stroke this gives an unbalanced vertical force (assuming a vertical engine) equal to the total kinetic energy of the reciprocating mass, or  $\frac{1}{2}$  m  $v^2$ , where m is this mass and v the velocity of the piston at this point equal to the crank pin velocity. At either end of the stroke, however, this force is o, since the velocity of the piston is then o. Thus it is readily seen that this method would give a very imperfect balance. According to the Motor Cycle, of England, the counterweight should be made equal to the rotating mass and half the reciprocating mass. Then at the mid-point of the stroke the unbalanced vertical force is just half of that in the former case (since the piston and counter-weight are moving in opposite directions), while at the ends of the stroke there is an unbalanced horizontal force of equal intensity due to the excess weight of the counter. Thus the tendency to vibrate, instead of being concentrated at two points of the revolution, is distributed evenly through four. This method is said to have given excellent results as applied to motorcycle engines. Quoting from the Motor Cycle, an easy way to obtain this balance is as follows:

"Stand the flywheels beside the weighing scales, place the piston on the pan. and block up one or other of the wheels until the connecting rod is level, weigh piston thus, and it will give us the weight of the reciprocating mass. Next, exactly opposite to and on the same radius as the crank pin, drill a small hole, one-eighth of an inch is ample, then get a piece of wire and bend the end at right

angles, so as to hang out of the hole quite freely, and on the end of the wire hang weights equal to one-half the reciprocating mass. We now want a couple of short lengths of steel rod about one-half of an inch in diameter; these are to be laid on two benches parallel to one another and very carefully leveled. When everything is ready place the flywheels on them with a main shaft on each rod and weight hung out of small hole. It will be easy now to see which side is too heavy, and holes may be drilled there until the flywheels remain in any position whatsoever." N. FLOYD.

#### Flexible Metallic Tubing.

Editor Horseless Age:

We notice in your description of our flexible metallic tubing in the July 14 issue of The Horseless Age that you say the tube may be used for exhaust pipes and hot air collecting devices for carburetors, but we feel sure that the tubing you have seen used for this purpose is not ours, but a tube of a considerably thinner wall, made from a single coil of flat brass and an asbestos packing.

The Almond tube is made from two coils of wire, one coiled outside the other. The inner coil is a spring tempered wire round in cross sections and coiled close, with no opening between the convolutions. The outer coil is a tinned soft iron or brass wire, half round in cross section, wound with the flat side over the spring, and forced with considerable pressure in between the convolutions of the spring, thus making a tight joint. It will stand twenty-five (25) pounds pressure.

If this tubing is used for conveying exhaust gases, the high temperature draws the temper of the inner coiled spring, softening the wire sufficiently to cause leaks, and also melts the solder used in attaching the fitting, so that it is impossible for us to recommend it for this purpose. It is most useful as a conveyor of grease, oil and gasoline.

T. R. ALMOND MANUFACTURING Co.

## To Improve the Cooling System of An Old Car.

Editor Horseless Age:

I am building a new radiator and water circulation system for an old car equipped

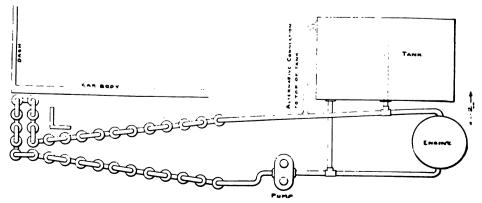
with a single cylinder, horizontal, four cycle, 8 horse power motor under the body The cylinder dimensions are 5x6 inches. I want to ask a question in regard to this circulating system, as to whether there is any advantage in using the tank which forms part of the system. It is quite a large tank, separate from the radiator. In an article I saw in a back number of THE Horseless Age it is advocated to use the tank as a reservoir connected with the circulating system. The idea is entirely new to me, but if it is practicable I wish to embody it in the circulating system which I am planning, as it would do away with the only weak or undesirable feature of the design.

The accompanying sketch shows the way I plan to arrange the cooling system. I would like to know whether there is any other possible arrangement of the parts (tank, pump, engine, etc.) that is preferable, and also whether I can improve on the shape and type of radiator.

First as to the circulation through or past the tank. The accompanying sketch is intended to show only the locations of the parts, the relative distances between them, and their relative heights, and to give the rise or fall of pipes. Some of the inclinations are exaggerated, particularly those to and from the engine. The pipes, unfortunately, are quite long and have many bends in them, but the worst ones cannot be eliminated.

Originally the circulation was from the top of the engine to the tank, to the radiator, to the pump and back to the bottom of the engine. The water was always boiling and the motor overheated, and I concluded that some advantage could be gained by changing the order of circulation as follows: From top of engine to radiator, to tank, to pump, to bottom of engine. Can this order of circulation be improved?

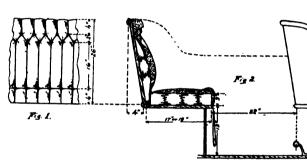
Now, as to the circulation through or past the tank. My objection to the first plan I laid out was based on the curved pipe which has to connect the radiator to the tank if it is to enter the tank on top, avoid the crank case, etc. This is the only bad feature of the design, the arrangement of all the other parts tending to aid thermal or gravity circulation. I see that in the sketch reproduced from one of your back numbers the pipe enters the tank below the top. I would like to know whether



this is practically possible, as if I can go from the radiator to the pump direct I can avoid this long upwardly bent pipe, though I am still compelled to make an upward curve.

The other question I want to ask is, What sort of radiator is best to put in the available space, which, as shown by the sketch is 25 inches long by 71/2 inches deep, with an upper front L 434x31/3 inches? I would greatly like to use this L space, but I know of no way by which to accomplish it. My present plan is to build a radiator myself of a continuous coil of 34 inch flanged copper tubing, the horizontal length to be 26 inches, making a total length of pipe of 41 feet, arranged triangularly as shown. This promotes thermal or gravity circulation and avoids bumping of the radiator against the axle, due to unusual compression of the springs. If I were to put in more layers of pipes some of the pipes would come over the front axle; and, besides, the radiator would be a compact mass, and the air circulation through it would be retarded. Can the 434x31/2 inch space be utilized? The pipe from the en-

gine must enter at XA as now, that is, below the frame. Water can only be gotten to the top of the 43/4x3½ inch space by raising it 3½ inches either in the radiator or without it. Can either be done with advantage? Could the 43/4x3½ inch space be used by a



SEAT CONSTRUCTION.

regular cooler construction arranged vertically, or in any other way?

Can you advise me whether the form of radiator tubing in which separate copper fins are soldered to the tube or the spiral copper fin on copper tubing is the best? If the spiral tubing is the best, where can I purchase it? My sketch shows 26 lengths, making a total of 41 feet of 134 inch fin tubes spaced as closely as possible. The spiral flange tubes would probably have flanges of smaller diameter. In that case would it be preferable to use the number of tubes indicated in the drawing, with air spaces in between, or to place adjacent tubes as closely as possible, using an increased length of tubing, perhaps 50 per cent. more? FCF

[We would advise that you connect the tank in parallel to the radiator by running a pipe from the pump to the bottom of the water tank, and a pipe from the upper pipe to the engine jacket nearly to the top of the tank. The latter pipe may extend up inside the tank or connect to the tank near the top outside. This will greatly simplify the piping.

It is quite possible to use the 43/x3/2 inch space, as you can run your coil up into it, then down again and then back. We do not know whether the plane or

spirally flanged tubes are best, as no comparative tests have been made to our knowledge.—ED.]

#### Comfortable Seats.

Editor Horseless Age:

The comfortable seat in automobile bodies has been neglected to some extent. The inventors of the earlier machines generally fitted them with freakish designs of bodies, they having had no experience in this line of the business. The design of carriage or automobile bodies should be left to the expert body designer. This is an art by itself, which can be acquired only by very long experience. But no matter what may be the shape of the seat, it is largely left to the carriage trimmer to produce a comfortable, easy riding seat.

There are standard dimensions of seats to some extent, which are now and then changed to suit circumstances. The more nearly vertical or straight the back of the seats are the shorter the body can be built—a leaning back necessitates more foot room and making the body longer.

The most comfortable as well as best ap-

pearing back is the "pipe tufted" one, Fig. 1. This style of back conforms best to the outlines of the human body. A seat constructed after the lines and measurements of Fig. 2 will make a compromise seat for long or short drivers, the back being moderately inclined. For a special machine for touring the back should be inclined somewhat more. An adjustable arrangement to suit the individual would be advisable, and could be made by fastening the lower part of the back to the rear end of the chassis and have the chassis on a short slide, say 6 inches. When the chassis is pulled forward it will incline the back more.

Reverting to the seat shown in Fig. 2, the springs must be placed in the right position, and the upper roll should be made firm, but at the same time soft. The best obtainable horse hair should be used for that purpose or it will not hold its shape.

The cushions should be built up of a spring box covered with a layer of horse hair and not tufted. Across the front, on top of the cushion, a 3 inch roll will give a good support under the knees. The foot brace must be placed in the proper position, or, if possible, be made adjustable. According to carriage practice a straight or nearly vertical back will give a natty appearance to the body, and for short rides,

as in society drives, this is the conventional type. It is advantageous to the appearance of ladies' dresses, and the sitting position is more graceful. The inclined seat gives more rest to the human body, as it distributes the weight over a larger area and permits freer circulation of the blood; hence avoids fatigue. All mail or stage coaches have inclined seats and box spring cushions.

JOSEPH LEDWINKA.

#### Friction Coefficient for Use in Calculating Cork Insert Clutches.

Editor Horseless Age:

Kindly inform me in your valuable paper about the following:

What friction coefficient is safe to use in calculating a cork inserted cone clutch, surfaces oiled or dry? Which of the two, oiled or dry, is preferable?

[We referred this question to the National Brake and Clutch Company, Boston, Mass., who inform us that the following are the friction coefficients for various frictional materials:

#### COEFFICIENTS OF FRICTION.

New leather on dry metal, say	. 23
New leather on oily metal, say	. 15.
Old, dry, hard or charred leather on oily metal.	. 08
Leather with cork inserts on dry metal	.35
Leather with cork inserts on oily metal	. 32

Assuming that a designer proposes to take .15 as the coefficient of friction for a leather faced cone the company advise that he take .20 as the basis of calculation for a leather faced cone having an angle of face of 12½ degrees and equipped with cork inserts, and that he reduce his spring pressure approximately 33½ per cent. They do not recommend that a leather faced cone with cork inserts be run in oil, but advise lubricating it from time to time with ordinary cylinder oil if it grabs too harshly; otherwise, allow it to run dry.—Ep.]

#### The Austrian Automobile Industry.

The Austrian Automobile Manufacturers' Association has recently issued its year book for 1909, entitled "The Austrian Automobile Industry and Its Resources." The book contains no less than 400 pages, and is intended to serve both the purpose of publicity for the industry, and as a work of reference. The Austrian Automobile Manufacturers' Association is only of relatively recent origin, having been organized on April 15, 1907. The members are divided into groups according to the number of their employees, with corresponding voting powers. Automobile manufacturers are divided into five groups, employing up to 30, up to 100, up to 200, up to 500, and above 500 men respectively. The accessories' manufacturers are divided into only two classes, viz., those employing up to thirty, and those employing over thirty men. Dealers are also admitted to membership, and each has one vote. The association at present comprises ten automobile manufacturing firms, and twenty-seven firms engaged in the manufacture of automobile accessories.

## Commercial Applications.



## The Taxicab Business in Philadelphia.

By H. J. D.

The taxicab business in Philadelphia, Pa., is practically controlled by three companies. viz., the Bergdoll Motor Car Company, the Pennsylvania Taxicab Company and the Quaker City Cab Company. In addition to these a few individual owners operate taxicabs. Philadelphia offers a very promising field for taxicab operation, inasmuch as large first class hotels are scattered throughout the city, and, besides, Philadelphia is the scene of numerous conventions and reunions of lodges and secret societies. While there are a large number of taxicabs in service at the present time it is quite obvious that in a year there will be twice as many.

THE BERGOOLL MOTOR CAR COMPANY, with offices and garage at the corner of Broad and Wood streets, is at the present time operating thirty cabs. These are all Thomas cars of the landaulet type. The company are now building their own cabs, to be known as Bergdoll "Thirties." These are being built right on the premises, and will supplant the cabs now in service when completed. Fifteen will be put on the street early in September, and thirty-five more before the end of October.

One of the features of the Bergdoll cab is that the motor and transmission are one unit, which is very easily removed by taking out four bolts. When the bolts are removed the motor and transmission may be dropped, after which they may be repaired or adjusted and then placed back on the frame without disturbing any other part of the car. Another notable feature of the Bergdoll cabs will be the fact that for each one there will be two bodies, a closed body for winter use and a touring body for summer use. The closed body is of the brougham type, roomy and airy. It is upholstered in plain leather, so that it may be handily washed and cleaned. The floor of the body is laid with linoleum, which also covers the lower half of the doors. The back cushions are of tufted leather. The doors have three hinges. The tourng body is also of special design. All the Bergdoll cabs will carry a speedometer.

The Bergdoll Company have no regular stands, most of their business being done direct from the garage, orders being received by mail and 'phone. They also rent out the cabs by the day, week or month.

Pneumatic tires are used, with demountable rims, both of Fisk make and maintained under contract by the Fisk Tire Company.

The rates are 50 cents for the first mile, 40 cents for each additional mile, and 20 cents a mile to call where desired. The

same rate is charged for four passengers as is charged for one. The taximeters are driven from the rear wheels, while the front wheels are equipped with odometers. By this method one must tally with the other, and in the event of their not tallying an average is taken which is accepted as the correct distance.

The Bergdoll Company have a novel plan for the remuneration of their operators. The car is leased to the driver each day, and he is allowed a percentage of the entire day's receipts. By this system the firm is immune from any legal liability due to negligence or carelessness on the part of the driver.

THE PENNSYLVANIA TAXICAB COMPANY,

located at 1407 Locust street, are at the present time operating twenty-one taxicabs. This concern also has its offices and garage in the same building. The cabs now in this service are two cylinder Autocars and cars assembled by the company themselves, which are equipped with Continental motors. The number of cabs will be doubled before the end of the year, and Autocars will take the place of the assembled cabs. The taximeters are on the rear wheels now, but will all be changed to the front wheels.

This company controls probably the best stand in the city, in front of the Bellevue-Stratford Hotel, the largest in the city and one of the finest in the world. It accommodates the élite set from all parts of the country when visiting Philadelphia. This stand alone keeps a good portion of the cabs working all the time. In addition to this they have a large select list of regular patrons, who order a cab when they need it by 'phone.

On the Autocar cabs Fisk detachable tires are also used, and on the others Diamonds of the regular clincher type.

The rates are 50 cents for the first mile, 40 cents for each additional mile and 20 cents a mile to call, outside of a half mile from the City Hall.

The company also hires out five Packard touring cars for special service or country trips. These are not, however, equipped with taximeters and are charged for by time. All repairs to both the touring cars and taxicabs are made right in the company's shops.

The operators are paid a commission on the net receipts, but the company assumes all liabilities for accidents and personal injuries sustained at the hands of a driver.

The busiest hours on week days in the summer are from 11 a. m. to 2 p. m. and after 6 p. m. On Sundays the cabs are busy all day, and also in the evening.

The officers of the Pennsylvania Taxicab Company are Joseph T. Kinsley, president; Paul Samorelle, vice president; W. C. Wilson, secretary and treasurer; George W. Close, assistant secretary and treasurer.

THE QUAKER CITY CAB COMPANY, who also operate the Taxi Service Company, have two garages, one at 1211 Vine

street and the other at 305-7 North Twelfth street. The company are at present operating thirty-five American Locomotive cabs. They will increase this number by twenty-five on September 1. They have hacking stands at the railroad station and at several of the important hotels.

Their cabs are not equipped with taximters, and their charges are \$4 per hour. If the cab is used less than one hour the occupants are charged proportionately. Quick detachable pneumatic tires are used, and Stepney spare wheels are carried on all the cars. The company have no maintenance contract with either the car or tire manufacturers and do all their own repairing at their own shops.

The chauffeurs are all paid a regular weekly salary and all gasoline, oil and parts are furnished them by the company free of charge. The busiest hours on week days during the summer are from 2 to 6 p. m.; in the winter from 4 to 9 p. m., and on Sundays from 11 a. m. to 11 p. m. The superintendent claims to have no trouble in securing good drivers. The latter must supply their own uniforms.

The Quaker City Cab Company have started negotiations for a new home at 1207 to 1217 Vine street. A four story brick building at that address is to be used as a garage and offices. The first floor will be used for the company's business and the upper stories for storage purposes. The building was designed by the engineer of the American Locomotive Company, and it is estimated that the cost will be about \$100,000. The structure will be known as the Jarvis Building.

The cabs that are being operated by individual owners are of various makes, and in the majority of cases no regular systems of operation are employed. In the State of Pennsylvania no hacking license is required to run a taxicab, nor are there any special ordinances governing them. A taxicab has only to carry an ordinary automobile license tag and comply with the regular automobile laws.

#### Commercial Notes.

The Taxicab Company, of Nashville, Tenn., is reported to be doing a good business, and will shortly place three additional cabs in service.

An automobile service will shortly be inaugurated between Bridgeport and Upper Stepney, Conn. A large bus will be used, and four round trips will be made per day.

Frank Huffman, Middletown, Ohio, will shortly place in service a motor bus made by the White Company, of Cleveland, Ohio. Mr. Huffman will operate the car over a belt line in the city.

The Maine Summer Resort Company, which is developing Idlewild Park at Cundy Harbor, Me., will shortly inaugurate an automobile stage service. A combination vehicle for carrying either nine passengers and baggage or fifteen passengers without baggage has been purchased.



# New Indianapolis Ordinance.

Ordinances requiring the registration of automobile and motorcycle drivers and operators, and also further regulating such vehicles, have been passed by the Indianapolis city council, signed by Mayor Bookwalter and are now in effect.

Prospective drivers must appear before the board of public safety, giving their names, addresses, ages and qualifications for driving. If such information is satisfactory the board will authorize the city controller to issue a license upon payment of a \$1 fee, the license to be good for one year. Changes of address must be reported within five days, and for a third violation of any automobile ordinance or law the judge of the police court is given power to revoke a license. A workhouse sentence is provided for attempting to drive an automobile or motorcycle after a license has been revoked.

Another measure requires the use of mufflers, prohibits the running of machinery when cars are left unattended, requires the display of lights on front and rear when cars are left standing in the streets at night, and fixes the minimum age limit of drivers at seventeen years. A measure is pending in the council to increase the police motorcycle corps from three to five men, the corps being used in running down violators of the speed laws.

# Owner Protects Reckless Driver.

Fred A. Cornell, a Los Angeles automobile dealer, was arrested July 25 charged with being an accessory after the fact in the killing of Mrs. Dora Feller ten days previous by his driver, Carl Fisher, though Cornell was not in the car he owned at the time his driver struck the woman. Because he failed to turn over to the police information about the guilty party, and because, after his arrest, he assisted the driver in making his escape, Cornell was held under \$15,000 bail, and will be tried on a charge of manslaughter, with a penitentiary sentence in prospect on account of the state of public sentiment aroused by the numerous fatal accidents caused by teckless drivers.

The victim was killed while crossing the street in front of her residence at night. The machine was going at high speed on the wrong side of the street, without lamps, and the driver succeeded in escaping without having his identity established or the number of the machine ascertained. The rewards of \$650 offered by the Motorists' Protective Association and the police led to his identification, through the remark of a woman dropped on a pier at a nearby beach resort and overheard by an officer on his

vacation. The woman boasted of being able to earn \$650 by informing the authorities of the name of the man who killed Mrs. Feller.

When Cornell, the owner of the car, was arrested at his garage he asked for time to pay off his men, and made use of the opportunity to warn the driver, who was in the shop, and who fled at once. When he realized the consequences of aiding the man to escape Cornell confessed in an effort to clear himself. He gave the names of the women who had been in the machine at the time of the accident, and these women related that Fisher, after killing the victim, sped away, stopped at a distant corner, wiped the blood from the machine, removed pieces of the dead woman's dress and burned them. The owner of the car was told of the accident the next day, and at once sold the automobile.

# Proposed Detroit Licensing Ordinance.

The committee on ordinances of the Detroit common council has approved an ordinance which provides for the licensing of all drivers of automobiles, except owners, who are practically immune from city regulation under the State law. John Gillespie, representing the Detroit Motor Club, and Robert K. Davis, representing the Detroit Automobile Dealers' Association, attended the hearing. Both appeared anxious for an ordinance which would tend to do away with speeding. Mr. Davis wanted the ordinance drawn so that the immediate family of the owner could operate the car without a license. Mr. Gillespie suggested that while all drivers be licensed only paid drivers be required to wear a badge.

As approved by the committee the ordinance requires that all drivers pass an examination before they receive a license, and that all drivers of cars must be sixteen years old or over. Visiting drivers will be allowed three weeks before being required to take out a license. It is proposed to draft an ordinance defining speed limits and penalties for infraction at an early date.

# Legal Notes.

Joseph Warren Smith, who tried to purchase an automobile from the Fisher Automobile Company, Indianapolis, with a fraudulent check, has been returned to the Indiana Reformatory to complete an unexpired sentence. After his arrest it was found he was on parole from the reformatory on another charge.

The decision against Herbert B. Tompkins, of Buffalo, N. Y., who was fined \$10 by Justice of the Peace Eiss for taking a turn at more than 4 miles per hour, was reversed by Judge Taylor in the County Court at Buffalo on July 28. The curve around which Mr. Tompkins drove when he was arrested was shown by surveyor's maps to be no more than 11 degrees, and Judge Taylor held that such curves were not included in the provision of the law.

which requires the speed to be reduced to 4 miles an hour in driving around turns in the road.

The police of Pittsburg, Pa., have collected the names of automobile owners whose cars are not provided with drip pans, and which do not comply with the city ordinance in other respects. The names of offenders will be presented to an aldermanic committee, and it is likely that warrants will be issued against them.

City Collector Magerstadt of Chicago has submitted to Corporation Counsel Brundage a list of automobile owners who have failed to pay taxes due on their machines since May I. The list will be turned over to City Prosecutor George H. White, who will begin suit for the collection of the taxes in the municipal court.

John M. Satterfield, president of the Buffalo A. C., and Herbert A. Meldrum, of the same club, appeared before the committee on ordinances of the Buffalo city council on July 22 to urge the passage of a new ordinance requiring all vehicles on the streets at night to be equipped with lights both in front and rear. They describe Delaware avenue as a most dangerous place to drive in on a dark night, and in return for the concession of the universal lighting provision they offered to accept a prohibition of all objectionable forms of warning signals on automobiles.

### Milwaukee Considering Wheel Tax.

The Milwaukee common council is considering an ordinance introduced by Alderman Eric Cramer Stern (its youngest member) providing a wheel tax for all motor vehicles, carriages, delivery wagons and other horse drawn vehicles, excepting bicycles, the proceeds of which tax are to go into the special street repair fund. The motor vehicle tax is graduated from \$5 to \$12, according to horse power, and horse drawn vehicles will be charged from \$1.50 for single rigs to \$15 maximum. "There is no reason," said Alderman Stern, in introducing the measure, "why the streets should not be repaired at the cost of the people whose vehicles and operations injure them."

# Parry Auto Company Settled.

A three year lease on the former plant of the Standard Wheel Company, of Indianapolis, has been taken by the newly organized Parry Auto Company, which concern is equipping the plant with the necessary machinery. The Parry Auto Company, which expects to have its first car completed about August 20, has an authorized capitalization of \$1,000,000. David M. Parry, former president of the Parry Manufacturing Company, is president of the new company. Others interested are Warren D. Oakes, former sales manager of the Parry Manufacturing Company; Maxwell O. Parry, a recent graduate from Yale University; William C. Teasdale, Jr., of St. Louis, a manufacturer, and Addison J. Parry.

# E-M-F Company Buys Drop Forging Plant.

Following the purchase by the E-M-F Company of the De Luxe plant in Detroit last week comes the announcement that the same company has also bought the entire property of the Western Malleable Steel and Forge Company, adjoining the De Luxe property. This plant, originally devoted to the making of malleable steel castings, has during the last three years followed the trend of demand and gone into the drop forging line on a large scale-so much so that the forging department has of late constituted the greater part of the business. Dropped forged parts, crank shafts, front axles, spindles, gear blanks, connecting rods, and, in fact, all the principal parts of the motor are now made in this plant, and several of the largest automobile manufacturers are said to be its customers

The possession of its own drop forge plant will obviate the chance of delay in deliveries of parts, which is a most important matter to a manufacturing concern operating on a large scale.

Besides the drop forging plant the E-M-F Company has also bought the plant of the Monroe Body Company in Pontiac, about 20 miles from Detroit. From this plant a great many bodies have been supplied to automobile factories the past several years. It is reported that about \$500,000 was paid for the two plants.

# The Mason Motor Car Company Removal.

Senator Maytag, principal stockholder of the Mason Motor Car Company, of Des Moines, Ia., has rejected the offers made by the Greater Des Moines Committee in their efforts to retain the motor car works in that city, viz., a free site of 40 acres and the placing of \$150,000 stock of the company among local investors, and has issued a statement to the effect that the company will be removed to Waterloo, Ia., in the near future. F. F. McElhinney and William Galloway, prominent Waterloo capitalists, have secured an interest in the Mason Company. It seems, however, that the removal still hinges upon certain conditions made to the Chamber of Commerce of Waterloo. If the latter body can meet these conditions the removal will take place.

# Plans of Cole Motor Car Company.

The Cole Motor Car Company, recently organized in Indianapolis, Ind., will occupy the property formerly used by the Overland Auto Company, and will manufacture a car known as the Cole Thirty, which is to be made in roadster, demi-tonneau and touring car types, selling at \$1,400, \$1,450 and \$1,500, respectively. The company, however, intend to add a smaller car, with a block type of motor, to sell at \$900 to \$1,000. The officers of the company are J. J. Cole, president; S. J. Juqua, vice pres-

ident; J. F. Morrison, treasurer, and Lester McCullough, secretary. The company are at present located in a four story building at New York and Agnes streets, which will be used as the painting and trimming department after the new plant has been occupied.

# Motor Mail Delivery in Indianapolis.

Four gasoline automobiles are now used by the Indianapolis post office. Ultimately it is the hope of Robert Bryson, postmaster, to use automobiles exclusively for the collection of mail and partially in the delivery of mail. The cars are used for carrying large bundles of mail to convenient points of carriers' routes, for delivering large bundles of mail to business houses and manufacturing concerns, and for collecting from street mail boxes.

# Touring Car Stolen.

The 1909 model Cleveland roadster owned by C. R. Manville, a Milwaukee member of the H. W. Johns-Manville Company, was stolen on July 15, and efforts of police, Pinkertons and representatives of the insurance company have failed to find it. The motor number is 3081, car number 2043; 45 horse power motor, 36 inch wheels, finished in drab.

# A New Wind Shield Company.

The Auto-Automatic Wind Shield Company has just been incorporated in Detroit by David N. Harper, C. F. Green and H. H. Seely. The capital stock is given as \$5,000, half of which is represented by physical assets.

# Tester Killed in Joy Ride.

John Swanson, a tester for the Pope Manufacturing Company, of Hartford, Conn., was fatally injured in an automobile accident at Windsor, Conn., on July The car was owned by James H. Knight, president of the First National Bank of Hartford, and was driven by his chauffeur, Michael Sullivan. According to eyewitnesses it went into a curve at about 60 miles an hour, skidded and crashed into a pole. Swanson, who was occupying a seat in the tonneau, struck the pole and died at the hospital shortly afterward. A young woman, who occupied the seat beside him, and the driver, Sullivan, were uninjured.

# Long Island Motor Parkway Matters.

The Long Island Motor Parkway Company has placed a mortgage for \$1,000,000 on its parkway property at Mineola, L. I., with the Windsor Trust Company of New York City, to secure a bond issue of like amount. The bonds will run twenty-five years and bear interest at 4½ per cent. It is said that the work of completing the parkway will now be pushed actively. The

completion of the parkway is being interfered with by a recent decision of the Nassau County board of supervisors not to permit the crossing of the parkway with Jericho turnpike at Bevel Hill, near Mineola. The matter will be taken to court.

# Garage Fires.

Four people were seriously injured by a gasoline explosion in the garage of the Berwin Auto Company in Allentown, Pa, on July 24. The explosion is supposed to have been caused by spilled gasoline being ignited by the headlight on the car of Marion Hertzog, of Kutztown.

A loss of about \$12,000 was sustained from a fire in the garage of Persons & Wonson, Worcester, Mass., on July 27. The fire was caused by the explosion of an electric light globe, which ignited gasoline that had been spilled on the floor. A chauffeur near the scene of the explosion was seriously injured.

# Overland Company Erects Three New Buildings.

The Overland Automobile Company, of Indianapolis, Ind., will spend about \$40,000 this year on enlargements to its Indianapolis plant, at Oliver avenue and Grover street. A building permit for a \$10,500 building, for an assembling and upholstering department, was issued on July 23, and two more buildings will be erected before the fall. These latter two buildings will house an enameling department and a power plant, respectively. The power plant will cost in the neighborhood of \$20,000. The buildings will be constructed of heavy timber and corrugated steel.

# Another Implement Company Enters Automobile Field.

The Kingman St. Louis Implement Company, St. Louis, Mo., have entered the automobile field, and have taken the Rambler agency in southern Illinois, eastern Missouri and Arkansas. The Kingman Company is said to be one of the largest in its line in the country, and does a business of about \$1,000,000 a year. L. N. Burns, manager of the Kingman St. Louis Implement Company, will have direct charge of the Rambler business in the above mentioned territory, and he will be assisted by J. H. Ramsden.

# Motorcycle Mail Delivery in St. Paul.

Postmaster Edward Yanish of St. Paul has made application to the Department at Washington for permission to purchase two 5 horse power gasoline motor tricycles for the collection of mail in the city. The machines will be specially built, and cost between \$300 and \$400 each. Some experiments were made with one such machine several months ago, and proved entirely satisfactory, and the only drawback to its use that can be foreseen at present is difficulty with the heavy snow in winter.

# MIN OR MENTION



Fred J. Willman and Martin Engseth have established the Minot Tire Company, Minot, N. Dak.

The Amos-Pierce Auto Company, Syracuse, N. Y., have recently made extensive improvements in their showrooms.

The Heitger Carburetor Company, Indianapolis, Ind., state that they will reorganize with ample capital to extend their business.

The Elkhart Motor Car Company, Elkhart, Ind., are about moving into their new factory, and will start an aggressive campaign in the fall.

The Couple Gear Freight Wheel Company, Grand Rapids, Mich., are bringing out an electro-gasoline truck with a four cylinder "gas" engine as prime mover.

On Wednesday of last week the Model Automobile Company, of Peru, Ind., broke ground for a building 400x75 feet. A large crowd of business men attended the ceremony.

D. M. Parry, who, as mentioned in a recent issue, has organized a company to manufacture automobiles, is negotiating with Connersville, Ind., citizens regarding locating there.

The Trenton Rubber Company, of Trenton, N. J., has changed its name to Thermoid Rubber Company, Thermoid brake lining having become its principal article of manufacture.

The Hawaiian Pineapple Company, of Honolulu, H. I., are using an 18 horse power Franklin runabout in connection with work between a cannery at Iwilei and the fields at Wahiawa.

We have a copy of the Circular of Information of the College of Engineering of the University of Illinois, published by the university at Urbana, Ill. The circular covers the university year 1909-10.

T. J. Kehoe, of the Dayton, Ohio, Automobile Supply Company, has constructed a new car, and is making arrangements for manufacturing it under the name of the "T. J. K. Special" in Fort Wayne, Ind., his former home.

Gray & Davis, the lamp manufacturers of Amesbury, Mass., have let a contract for the addition of a second story for the north wing of their present factory building. This will give them 25,000 square feet additional floor space.

The property of the Walter Automobile Company, Trenton, N. J., was sold on July 29 for \$83,000 to Judge George W. Mc-Pherson, representing the bondholders. The amount of the bonds, including interest, is about \$244,000.

The Austin Automobile Works, of Grand Rapids, Mich., may be removed to Fort Wayne, Ind. W. S. Austin, manager of the company, recently visited Fort Wayne, and is said to have been very favorably impressed by the city.

The Westinghouse Machine Company, Pittsburg, Pa., recently closed a contract for building 1,000 automobile motors, and it is reported that the company expect to go into this line of work extensively.

A permit has been granted to Albert Kahn for the erection of a four story factory of reinforced concrete for the Packard Motor Car Company. This factory will cost \$60,000, and is located one block south of the main factory.

The Empire Tire Company, Trenton, N. J., have recently opened a direct branch in Philadelphia, at the corner of Broad and Wood streets, in charge of E. B. Richardson, who was formerly for a long time connected with the Pierce Bicycle Company.

Ground has been broken for the new addition to the plant of the Federal Rubber Company, of Milwaukee, at Cudahy, Wis., a suburb. It will be three stories high, of solid brick construction, and will be devoted mainly to the tire department.

V. H. Kreigshaber, of Atlanta, Ga., is planning to begin the manufacture of automobiles, and to have his first machines ready in time to exhibit at the Atlanta show next fall. Runabouts and light touring cars ranging in price up to \$1,400 are to be made.

The Motor Company, Philadelphia agents for the Premier cars, have arranged an endurance run from Philadelphia to Cape May and back for Premier owners only, to be held Saturday and Sunday, September 11 and 12. A 2 gallon solid silver punch bowl is offered as a prize.

- John Galvin has purchased a building site at Long Island City, N. Y., on East avenue, between Thirteenth and Fourteenth streets, for \$20,000. Mr. Galvin intends to erect on it a four story reinforced concrete factory building in which to manufacture automobile specialties.

According to a report from St. Louis Jerome E. Harrington, a banker of Watonga, Okla., has closed contracts for 2,000 cars with manufacturers in Detroit and Indianapolis. He has secured the distributing agency for these cars for four States, and will have depositories in Oklahoma City and Dallas, Tex.

The Luce Manufacturing Company, Dalton, Mass., are installing machinery to manufacture a device to control the headlight of an automobile from the steering wheel, so that the light will be kept in the exact direction in which the car is traveling. Any make of car can be equipped with the device in twenty minutes.

We have received a copy of a pamphlet entitled "American Universities, American Foreign Service and an Adequate Consular Law" issued by the National Business League of America, Chicago. It relates to the facilities offered young men by various universities for preparing themselves for the consular service, gives a resolution adopted by the association disapproving of the plan to establish a national consular

school, and discusses "an adequate consular law."

According to the quarterly report of the A. L. A. M. the Cadillac Motor Car Company has done a larger volume of business in the last quarter than in any previous one.

The automobile owners of Webster City, Ia., who are now said to number seventy-five, are planning to ask the city council to be allowed the exclusive use of Superior street for two hours each day, one hour in the morning and one in the evening. The street would be used as a speedway for demonstrations, etc.

John W. Bergers, who recently retired from the Bergers Automobile Company, of Omaha, Neb., has organized a new company, known as the Western Automobile Sales Company, with offices and salesrooms in Omaha and Kansas City. The company will have a capital stock of \$50,000, and will do a wholesale business only.

A. H. Hopkins, formerly manager of the Cartier-Chapman Company, of Ludington, Mich., has secured control of a number of new inventions and embodied them in an automobile which he plans to manufacture in Ludington. The car is to be known as the "Utility," and is of the convertible type, making it available both for business and pleasure purposes.

The Fairview Motor Company, of Detroit, Mich., to whose organization by members of the Chalmers-Detroit Company we referred in our last issue, plan to erect a \$150,000 practically fireproof building on a tract recently purchased and located directly west of the Chalmers-Detroit plant. The company plans to manufacture taxicabs, trucks and delivery wagons.

A temporary receiver has been asked for the Motor Car Company of New Jersey, with headquarters at Newark. It is claimed that the concern is solvent, and that the proceeding is due solely to a change in the management, resulting from disagreement between the principal stockholders. The application was made by creditors of the concern, with the acquiescence of the managers, it is said.

A. M. Chase, of the Chase Motor Truck Company, Syracuse, N. Y., recently made a trip from that city to Whitefield, N. H., in a new Chase combination surrey and business wagon, which has just been completed by the company, and of which 400 are to be built this year. Mr. Chase stated that he had made the trip to Whitefield without mishap, having covered 107 miles the first day and 110 the second.

A meeting of local business men was recently held in Waukesha, Wis., at which a project to organize a company for the manufacture of automobiles, especially commercial vehicles, was discussed. It was decided to give financial encouragement to the project as soon as a competent man can be secured who will invest several thousand dollars and assume the management of the company. A capital stock of \$50,000 was suggested.

# Garage Notes.

L. G. Adolphson will open a garage in the Schweiger cabinet factory in Springfield, Minn.

The Russell Motor Co. has bought the plant and stock of the Duluth Motor Vehicle Co., Duluth, Minn.

Ground has been broken for the new garage of James Boyd in Norristown, Pa., on Main street, near Markley.

The Quaker City Cab Co., Philadelphia, Pa., are

The Quaker City Cab Co., Philadelphia, Pa., are receiving bids for a large garage to be erected on Vine street, west of Twelfth.

F. G. Hartman, of the Hartman Motor Car Company, of Omaha, Neb., has opened a repair shop in Huron, S. D., at 1150 Fourth sereet.

Andrew Reis, of Green Bay, Wis., has been appointed district agent for northeastern Wisconsin of the Moline. He intends to build a garage.

Another story is to be added to the Park Garage, Twenty-second and Spring Garden streets, Philadelphia, Pa. The work will probably be completed by September 1.

Howarth & Taylor have opened a garage at 172 Pacific avenue, Brocklyn, New York, where special attention will be given to repairs. They will also conduct a taxicab service.

H. K. Smith has purchased the Beckwith Garage from Everett and Orville Beckwith at Mt. Pleasant, Ia., for \$4,000. Mr. Smith intends to do an extensive livery business.

Robert Raymond, of Eau Claire, Wis., for several years foreman of the repair department of the Tanberg Auto Co., of that city, has opened a repair shop and garage at Bloomer. Wis.

George Pregler, Jr., of Madison, Wis., is building a large public garage and repair shop on West Johnson street. The dimensions are 30x120. It will be of brick construction, one story high.

Frank R. Bryant, who has secured the agency for Chalmers-Detroit and Hudson cars at Water-loo, Ia., will shortly begin work on a new garage building 140 feet long, and either 40 or 60 feet wide.

Fred W. Jackson is erecting a 30x100 one story garage in Holland, Mich., on Seventh street just east of the river. The building will cost about \$3,000, and will be ready for occupancy about August 15.

Chas. Hill has opened a garage and repair shop at 15 North Lake street, Aurora, Ill. Besides conducting a garage business Arr. Hill will conduct a regular blacksmith's shop and a second hand carriage business.

Contracts have been let for a \$20,000 garage building at Center and Morewood avenues, Pittsburg, Pa., for A. E. Pitcairn. The lot has a frontage of 46 feet, is 100 feet deep and 81 feet wide in the rest.

wide in the rear.

J. H. Flemming, Media, Pa., will open a garage in the old Market building at Front and Orange streets. Mr. Flemming formerly conducted a garage in the same building, but closed it to start a similar business in Baltimore.

Chas. E. Myers, Washington agent for Elmore cars, has purchased a half interest in the Vermont Garage, 1122 Vermont court, Washington, D. C., The Elmore cars will in the future be handled in Washington from this address.

Work has been begun on the new Totten Garage on Third avenue near Seventeenth street. Davenport, Ia. The building will be 40x100 feet, and two stories high. The garage will be fully equipped and a line of cars will be handled.

The Auburn Motor Company, of San Francisco, have moved into new quarters at 407 Golden Gate avenue. A permanent structure will be built for Walter C. Morris, agent for the Autocar, on the site of the building formerly occupied by the Auburn Company.

The Imperial Garage has been removed from 52-54 West Sixty-seventh street to 208-212 West Seventy-sixth street. New York city, where it will be opened for business September 1. The firm will hereafter be known as the Imperial Motor Vehicle Co. S. C. Stinzing is manager.

The United Motor Company, Wichita, Kans., has moved to 114 North Emporium street, into a new building containing a 52x100 feet showroom addition to office space. The company handles

the Auburn, Interstate and Mitchell cars. Morris L. Arnold is manager of the concern.

The building at the corner of Massachusetts avenue and Newbury street, Boston, Mass., has been sold to the Maxwell-Briscoe Motor Company, and will be fitted up as a permanent branch for that company. The site extends 112 feet on Massachusetts avenue and 125 feet on Newbury street, and is improved with a four story structure erected in 1892. The price paid is understood to have been in excess of \$300.000.

Charles S. Henshaw has been engaged by the E. R. Thomas Motor Company, of Buffalo, N. Y., to open and manage a branch of the company in Boston, Mass. The new arrangement took effect on August 1. For the present headquarters will be at 288 Columbus avenue, from where Mr. Henshaw formerly sold Thomas cars for a number of years, but arrangements will be made shortly for better headquarters. A new company will be organized.

The Pence Automobile Co., Minneapolis, Minn., are this week moving into their new building on Hennepin avenue and Eighth street. It is an eight story and basement structure, and the floor space is divided as follows: Basement and seventh floor, storage: first floor, offices and salesroom; second floor, garage; third floor, taxicabs; fourth floor, paint shop; fifth floor, stockroom for parts and accessories; sixth floor, top manufacturing and metal department; eighth floor, repair shop. The company handles the General Motors line.

### Trade Personals.

S. A. Dutton, formerly with the Racine Mfg. Co., has been appointed advertising manager of the Overland Automobile Co., Toledo.

Hazlitt L. Pelton, formerly San Francisco manager of the Tourist car, is now sales manager for the Reliance Automobile Co., agent in San Francisco for the Knox car.

Evan Shelby, of West Lafayette, Ind., has sold his garage in Crawfordsville, and has become territorial manager for the Buick Motor Co. Mr. Shelby handled the Buick for a number of years.

George B. Levy has resigned as president and general manager of the Standard Automobile Supply Co., Chicago, Ill., and has been succeeded by L. I. Brignan, who is the principal stockholder in the concern.

John G. Dale, formerly connected with the sale of the Fiat, Rochet-Schneider and other imported cars in this country, has been appointed the executive sales agent for the Simplex Automobile Co., New York.

H. F. Edmiston has assumed the position of manager of the retail department for the Gaeth Automobile Co., Cleveland, Ohio, and will have an office and salesroom at 152 Euclid avenue. Mr. Edmiston formerly conducted a business college in Cleveland.

F. R. Heym, for the last five years superintendent of the Burroughs Adding Machine Co., and who has served in various official capacities for fourteen years with the Brown & Sharpe Manufacturing Co., and for seven years with the American Screw Co., both at Providence, R. I., has joined the firm of Schweppe & Wilt, parts makers. Detroit, as factory manager.

# New Incorporations.

Vulcan Motor Co., Pittsburg, Pa.—Capital, \$5,000.

Gary Motor Car Co., Muskegon, Mich.—Capital stock. \$200,000.

Excelsior Automobile Supply Co., Chicago, Ill.— Capital stock increased from \$10,000 to \$50,000. Standard Automobile Supply Co., Chicago, Ill.—

Capital stock increased from \$30,000 to \$50,000.
Crow Motor Co., Elkhart, Ind.—Capital stock.

\$50,000. Incorporators, Frank A. Howe, Edward C. Crow and Martin E. Crow.

The Duquesne Auto Co., Pittsburg, Pa.—Incorporated in Delaware. Capital stock, \$3,000. Incorporators, Geo. A. Holliday, F. B. Minnick and Kirk Q. Bigan.

The Parry Auto Co., Indianapolis, Ind.—Capital stock, \$1,000,000. Incorporators, David M.

Parry, M. O. Parry, Addison J. Parry, Warren Oakes and W. C. Teasdale.

Robinson Auto and Supply Co., St. Joseph, Mo.—Capital stock, \$10,000. Incorporators, E. A. King, R. E. Calkins, W. M. Smith, Leo Muchenberger, W. H. Robinson and others.

The Badger Automobile Co., Columbus, Ohio.— Capital, \$50,000. Incorporators, A. M. Bellack, president; C. Kurth, vice president; Geo. Holtz, secretary, and J. R. Wheeler, treasurer.

Brookston Automobile Co., Brookston, Ind.— Capital stock, \$7,000. Incorporators, Milton Gay, J. H. Kneale, W. C. Holstead, John J. Nagle, Ira Bordner, C. J. Murphy, R. C. Alkire.

The Ogden-Farwell Garage Co., Milwaukee, Wis.—Capital stock, \$10,000. Incorporators, George F. Gerlach, J. M. Dorsey and A. C. Runkle. The company has been in business as a partnership for about a year.

partnership for about a year.

The Superior Motor and Machine Works, Duluth, Minn.—Capital stock, \$15,000. To manufacture and deal in automobiles, launches, steam and gasoline engines. Incorporators, Solon L. Perrin, Dr. H. J. O'Brien and H. C. Lavery.

#### New Agencies.

Atlanta, Ga.—R. C. Howard, Mitchell. Duluth, Minn.—A. J. Gerald, Stearns. Washington, D. C.—John J. Fister, Mora.

San Francisco, Cal.—Reliance Automobile Co., Knox.

Oconomowoc, Wis.—The Leaf Automobile Co., Kissel Kar.

San Francisco, Cal.—Howard Automobile Co., Oldsmobile.

Springfield, Mass.—Corcross Cameron Co., Chalmers-Detroit.

Yonkers, N. Y.—Rose & Hibbard, Hudson and Chalmers-Detroit.

Kansas City, Mo.—H. H. Embry, 1526 Grand avenue, Pierce-Arrow.

Chicago, Ill.—B. C. Hamilton & Co., 1218 Michigan avenue, Chadwick Six.

Kansas City, Mo.—Louis A. Robertson, 1108 East Fifteenth street, Empire.

Youngstown, Ohio.—The Elton Auto and Repair Co., Front street, Stearns, Cadillac and Detroit electric.

### Patents Issued July 13, 1909.

927,477. Tire.—John C. Barker, Leeda, England. Filed January 27, 1909.

927,511. Spring Wheel for Vehicles.—Thomas S. Dunn, Los Angeles, Cal., assignor of one-half to George Renwick, Los Angeles, Cal. Filed November 4, 1907.

927,529. Carburetor.—Norman T. Harrington, Lansing, Mich. Filed January 27, 1908. 927,530. Automobile Fender or Life Guard.—

927,530. Automobile Fender or Life Guard.— John A. Harris, Jr., Minneapolis, Minn. Filed May 12, 1908.

927,552. Engine Lubricating Device,—Arthur Krebs, Paris, France, assignor to La Société Anonyme des Anciens Etablissements Panhard et Levassor, Paris, France. Filed February 15, 1908. 927,578. Elastic Tread Vehicle Wheel.—Jasper Murrey, Cleveland, Ohio. Filed February 13, 1907.

927,619. Automobile Curved Road Illuminator.— Darius W. Wells, Oakland, Cal. Filed January 2, 1908.

927.642. Cranking Handle.—George J. Dallison, Ottawa, Ont., Canada. Filed November 25, 1908. 927.676. Vehicle Tire,—David Pollard, Philadel-

phia, Pa. Filed November 7, 1908.

627,087. Vehicle Wheel Rim.—Edwin C. Shaw.

627,687. Vehicle Wheel Rim.—Edwin C. Shaw. Akron, Ohio, assignor to the B. F. Goodrich Co., Akron, Ohio, a corporation of Ohio. Filed June 14, 1907.

027,704. Electric Igniter Device.—Louis Baskin. New York, N. Y. Filed May 7, 1907. 027,735. Hydraulic Steering Check for Vehicles.

o27,735. Hydraulic Steering Check for Vehicles.—Hermann Lemp, Lynn, Mass., assignor to General Electric Co., a corporation of New York-Filed March 9, 1907.

927,768. Headlight.—Charles L. Betts, New York, N. Y., assignor to R. E. Dietz Co., New York, N. Y. Filed April 23, 1908.

# The Horseless Age

First Automobile Journal in the English Language

**VOLUME XXIV** 

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# Practical Self Starting on the Spark.

By A. C. WOODBURY.

It is my belief that any four cylinder engine which is furnished with a battery and jump spark ignition with magnetic vibrator can be made to start on the spark. I have run several marine engines of a certain make on blocks in the shop. They were fitted with a carburetor which did not give a very good starting mixture; indeed we usually found the easiest way to start was for one to nearly cover the carburetor inlet with his hand while another cranked. Nevertheless, these engines started very regularly on the spark, even after the cylinders had become cold. They started on the witch repeatedly after standing over an hour, after having the pet cocks opened to release any compression which might remain, and after opening the pet cocks when the cylinders had become quite cold. They also sometimes "sparked up" after standing over night. With the spark retarded so that the points were always in contact in the timer when the engine stopped, I could stand at the switch and start and stop the engine every time, just as you start and stop the electric fan on your desk, by merely closing and opening the switch.

I believe there are not a few drivers and owners of four cylinder cars who do not clearly understand what occurs when an engine starts on the spark, or indeed why it will start so at all. This is either through lack of thought on the matter or because they have not a full understanding of what is taking place in each cylinder at every point in the cycle of operations of the engine. The following four paragraphs are meant for such.

### HOW AN ENGINE STOPS.

Whenever a four cylinder, four cycle engine in normal working order is coming to rest after the ignition is interrupted, it turns over a few times till the energy stored in the flywheel is so far dissipated that it will not carry through the compression stroke and over the dead centre The charge which was then being compressed now forces the piston back, turning the flywheel backward. In another cylinder a charge (unburned, because the ignition had been stopped) was being expanded. Now, as the flywheel starts backward this charge is compressed again. The flywheel is stopped again by this charge before the crank has passed dead centre, and after a few oscillations comes to rest with the cranks practically horizontal. This is because one valve in each of the other two cylinders is open (if the inlet valves are mechanically operated) and there are substantially equal charges confined in the two cylinders whose valves are closed. Therefore, in order to have the pressures equal on the pistons (the condition of rest), these equal charges must occupy equal volumes, thus bringing the pistons to the same level.

The line sketch, Fig. 1, may help to make this perfectly clear. It represents an engine which fires in the more common order of 1-3-4-2 and rotates in the customary direction, i. e., the top of the flywheel, shown at the rear, turns toward the left of the car. The exhaust valves are marked E, and inlets I. The crank shaft, pistons and valves are shown in one of the four positions in which they might stop. The first and fourth crank throws are toward the right—going up if the engine were rotating forward—while the second and third are toward the left—going down. The exhaust

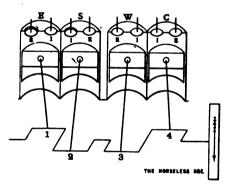


Fig. 1.

valve of the first cylinder is open so the first piston is on its exhaust stroke, and the fourth must be on its compression stroke. The third piston would then be on its expansion or working stroke and the second on its suction stroke with its inlet valve open. Letters over the cylinders show which stroke the pistons are on. The table below also shows in the first line the positions as in the figure, and in successive lines the positions after successive forward half turns of the crank shaft. E denotes

Cylinders.				Valves C	Position	
ſ	2	3	4	Exhaust.	Inlet.	of Crank.
E	S	W	С	I	2	As shown
S	C	E	W	3	1	Opposite
С	W	S	E	4	3	As shown
W	E	C	S	2	4	Opposite

exhaust; S, suction; W, working, and C, compression.

If the engine fired in the other possible order, 1-2-4-3, the positions of cylinders 2 and 3 would be simply reversed.

# AUTOMATIC INLET VALVES.

In the case of automatic inlet valves, the inlet valve which was open just before the flywheel stopped and reversed its direction for the first time will then close and remain closed, thus confining a partial charge above the piston which moves with the one which was expanding its charge. This tends to make the two pistons which are stopped on the down stroke slightly lower than the others, but not enough to seriously affect the starting on the spark. The difference it does make will be noted later.

#### HOW THE SPARK STARTS IT.

Fig. 2 shows the timer in about the position it would normally be to correspond with Fig. 1. The inside arrow shows which way the shaft and wiper arm rotate, and the arrow on the operating rod shows the direction to move it to advance the spark. With the rod as shown the spark will begin about on dead centre, but with the engine at rest we see that there is no contact in the timer, therefore no spark in any cylinder. However, if there is room enough for the required motion of the spark lever on its quadrant we can produce a spark in the fourth cylinder by advancing the spark. or in the third by retarding. In any case advancing will cause the spark to come in the compression stroke and retarding will bring it in the expansion or working stroke. It is sometimes possible to start an engine by advancing the spark till the engine kicks backward, then quickly retarding it to catch another piston, after which it must make a whole revolution forward before another cylinder will fire. This method is uncer tain and involves an explosion of full force against a piston and flywheel going backward, so I do not think it worth serious consideration.

In order to start the engine forward from the position shown we should produce a spark in the third cylinder—i. e., retard the spark. We should then get an explosion of sufficient force to start the engine forward half a revolution. This half revolution of the engine will turn the wiper arm of the timer 90 degrees in the direction of the arrow. By this time it would make contact at 4 in spite of being retarded a little from the position shown, and would cause a spark in the fourth cylinder which is now on its working stroke, as shown by the table. Another half turn of the engine with the corresponding quarter turn of the

wiper arm will bring a spark in the second cylinder, which our table shows will then be on its working stroke. Thus the engine continues to run, although it will give very little power till the spark is advanced.

WHY SOME ENGINES FAIL TO START ON THE SPARK.

If any four cylinder engine will not start from the switch it must be either because the ignition system is incapable of producing a spark in the cylinder whose piston is stopped on its working stroke, or because that cylinder, or one of those following, does not contain a charge of quality to be ignited or of quantity to throw the engine over the dead centre.

#### THE SPARK OFTEN AT FAULT.

Some cars are arranged with rather limited motion of the timer lever. This is not without reason, as it may be made to prevent unskilled drivers from running with the spark so much retarded as they otherwise might, or from advancing it too far. In other cars also the adjustment is such that with the lever in the position of extreme "retard" the spark will come about on dead centre—the best position for

cranking. With such an adjustment starting on the spark is impossible, as the timer cannot be thrown around far enough to make the contact necessary to produce a spark above the piston which has stopped on its working stroke—No. 3 in the figures. Any advantage gained by the above adjust-

ment must therefore be sacrificed for starting on the spark.

The simple remedy is to lengthen or shorten some rod in the connections so the spark can be retarded enough to make the vibrator buzz with the engine in the position in which it naturally stops. An adjustment is usually provided which may be sufficient.

In some cases it will be found that when the spark is retarded the timer arm and rod are as shown by the dotted lines in Fig. 2—too nearly in a straight line for safety. In one such case I had the rod A lengthened two or three inches so as to bring the timer arm around about 90 degrees, as shown by the full lines, then each wire on the timer was moved to the next post in the direction of the arrow.

In case the motion of the timer lever is not sufficient to give enough advance when the timer is adjusted to "spark up" the simplest remedy will usually be to make the timer arm shorter, as by drilling a hole at B. or to make the lever at C longer. The arrangement may be quite different from this, but almost always a lever can be found which can be made longer or shorter, as required, to make the motion of the "mer greater for the same action of the

Of course, as ordinarily constructed, an engine provided with magneto ignition only, with contact spark, or with non-vibrator coils, cannot start on the spark; but that all can be so constructed as to gain this end is shown by the following: Magnetos have been made to produce a spark without turning the engine over; the Matheson engine (contact spark) is provided with means for snapping the spark plug of the proper cylinder for self starting, and the Atwater Kent system provides a starting spark from a non-vibrator coil. WHEN THE VIBRATOR WILL BUZZ WITHOUT A RESULTING EXPLOSION.

The trouble in this case is not with the spark but the charge. The nature of the charge and conditions affecting it have been quite fully discussed in The Horseless Age by J. V. S. Bickford ("Self Starting Devices," December 2, 1908) and "The Trouble Man" ("Expedients by Which Starting on the Spark Can Be Made More Certain," May 5, 1909). The interested reader is referred to these articles. I will repeat only enough to say that the fault is almost always too little gasoline in the

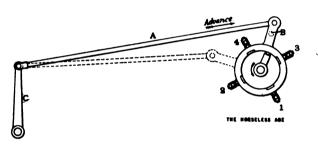


Fig. 2.

mixture, and some carburetors cannot be adjusted to give a mixture rich enough for easy starting, on the spark or otherwise, without giving too rich a mixture for economy and best results in running. In this case the remedy is to provide convenient means for flooding the carburetor or partially closing the air inlet while the motor is stopping.

The impression seems to be very general that an exceptionally gas tight cylinder is a condition necessary for self starting. That this is not the case can be proven on almost any motor which starts readily on the spark if it is provided with interconnected relief cocks. Open the cocks for a moment to let all the pressure out of the cylinders, and it will start almost as surely as when they are left closed. If an engine which starts on the spark immediately after stopping fails to do so after standing it is not because the pressure has fallen through leakage, at least to the extent that many engines start in spite of that. The trouble is that the gasoline has condensed and perhaps gathered on the cylinder walls so that the mixture is left too weak to be ignited without compression, or to provide sufficient force to start the engine if ignited. To extend the possible time of rest before self starting make the mixture a little richer in stopping as suggested above. I believe that most engines can thus be made to start on the spark almost every time after a stop of ten or fifteen minutes, generally after an hour, and sometimes after standing for a day or longer. In the winter or late fall there is not so much chance of starting after the water in the jackets has lost its heat.

WHEN THE MOTOR "KICKS" BUT DOES NOT CONTINUE TO TURN.

If any explosion occurs the motor is almost sure to go over the centre and make about half a revolution. Then it is "up to" the cylinder which stopped on its compression stroke. This was the last one to draw in a full charge as the engine stopped. and may have a poorer charge than the one ahead, as the speed of the engine was then slower. In an engine fitted with automatic inlet valves this piston is likely to stop higher than the middle of the stroke. as explained above under "Automatic Inlet Valves," so if the charge has had time to leak out there is only a small amount left. The spark will also have to be retarded more to make the first buzz of the vibrator, because the engine stops in a slightly different position. However, the engine is already turning when this cylinder fires, under some compression, so it will usually do its duty.

Aside from enriching the mixture in stopping this condition can be relieved by the following expedient: Place the spark lever in the position on the quadrant known to bring the spark on dead centre. (This point should always be known and marked.) Close the ignition switch and place one hand on the quadrant and against the spark lever, so as to prevent advancing the spark beyond that point. Now with a quick motion retard the spark to the limit, or at least far enough to cause the vibrator to buzz, and bring the lever back against your hand instantly. This causes the spark as required in the cylinder which stopped on its working stroke, and yet brings the spark in the next cylinder where its charge is most compressed, most likely to be ignited, and able to do the most work of which it is capable instead of after it has partly expanded again and has only part of a stroke left in which to work.

If an engine stops after two cylinders have fired and it has turned a full revolution it would not start with the crank without priming or its equivalent. But the cylinder which would fire third was left with a partial charge and its inlet valve open, so it has to rely for its charge, at least partly, upon what it draws in as the engine starts at about cranking speed. So it may be that an engine which kicks over and then stops can be kept going by priming the carburctor before starting or by partly closing the air inlet for a moment as the engine starts.

### IN CONCLUSION.

It is well to remember, as hinted by "The Trouble Man," that in adjusting for a rich enough mixture at extremely low

speeds there is danger of getting an unnecessarily rich mixture for ordinary speeds. This will cause sooting and a slow burning mixture with loss of power, overheating and burning of exhaust valves. It is better to make the mixture right for best running and provide means for priming or otherwise temporarily enriching the mixture.

Self starting is very convenient, especially for one who makes frequent stops, and self starting on the spark can be made quite reliable, at least for a short talk at the roadside or a stop for a frightened horse. I hope this may help some users to save labor at the crank and enjoy one more of the luxuries of motoring.

# Energy Consumption of Commercial Vehicles.

Paper read by Alex. Churchward before the Society of Automobile Engineers at Chicago.

When studying the performance of the motor vehicle, one of the most important items is the energy required per ton mile. We can rely upon the engine to give a certain horse power output at a predetermined speed. Therefore, knowing the maximum horse power output of the engine, we can readily determine what service the vehicle is capable of performing.

is capable of performing.

The horse power required by a vehicle, however, is influenced by a number of factors, the principal ones being:

# I.-TIRES.

Ordinarily the standard vehicles are equipped with either pneumatic or solid tires, pneumatic on the lighter vehicles, such as runabouts, coupés and broughams. Solid tires on some runabouts and cabs, and nearly always on commercial vehicles.

The tractive effort of pneumatic tires on hard level asphalt varies from 15 pounds per ton for special tires designed for electric runabouts up to 35 pounds per ton for the standard type used on gasoline touring

The tractive effort of pneumatic tires is also greatly affected by the air pressure, increasing rapidly as the air pressure is reduced.

The tractive effort of solid tires on hard level asphalt varies from 18 pounds to 26 pounds per ton, depending upon:

(1) The diameter of driving wheels.

(2) Revolutions per minute.

(3) Load in pounds, per square inch or pounds per inch width.

(4) Composition of the compound used.

(5) Method of attaching tire to wheel

# 2.—CONTROLLING APPARATUS.

The efficiency depends a great deal upon the type of drive used, such, for instance, as:

- (1) The sliding gear with direct drive on the high through a bevel on live rear axle.
  - (2) Sliding gear with direct drive on

high through countershaft and chains to dead rear axle.

- (3) Sliding gear, not direct on high, and through countershaft and chains to dead rear axle.
- (4) Planetary with direct on high by means of bevel or chain to live rear axle.
- (5) Planetary countershaft through chains to dead rear axle.
- (6) Friction gear to live rear axle through bevel or chains.
- (7) Friction gear to dead rear axle through chains.
- (8) Worm drive direct on high to live rear axle.

Some form of independent clutch being used on the 1, 2, 3 and 8.

#### 3 .- TRANSMISSION LOSSES.

These include gearing or chain losses, and all bearing losses throughout the vehicle. Most vehicles today are built with anti-friction bearings throughout.

Ball bearings should always be used in the countershaft; ball or roller bearings in the wheels. Personally, I prefer ball bearings throughout, and my experience has shown that ball bearings in the wheels are perfectly reliable when properly selected and correctly installed.

From countershaft to wheels the roller chain has proven itself satisfactory, but care must be taken in the selection of the make of chain, also the right pitch and number of teeth in the sprockets.

4.-ALIGNMENT OF AXLES AND DRIVING

### MECHANISM.

Unless the alignment is perfect under all conditions of maximum stress the energy consumption will be high. An axle sprung beyond the elastic limit by overloading may increase the energy consumption .10 per cent. to 15 per cent.

A vehicle that coasts freely may require too much power when the driving stresses are applied.

Therefore, all parts must be in perfect alignment under all conditions to be met with in service.

# 5.—CORRECT GEAR RATIO.

Unless the gear ratio is correct for the average service the vehicle is called on to perform the motor will either run at too high an average speed or the change gears will have to be used very frequently, which will tend to increase the maintenance of the vehicle when placed in the hands of a careless driver.

### 6.-WHEEL DIAMETER.

Small wheels will increase the energy consumption materially on the average roadbed, because the smaller the wheel diameter the greater the vehicle vibration when going over an obstacle of a given

### 7.—SPRINGS.

The springs of a vehicle must be correctly proportioned and of suitable material, otherwise there will be considerable movement of the vehicle body when going over uneven roads; this, of course, means energy consumed which cannot be restored.

#### 8.—ROAD RESISTANCE.

The tractive effort of a vehicle will vary with the road surface as per table, taking the tractive effort of a vehicle on hard level asphalt as unity:

(1)	Level asphalt (hard)	1.00
(2)	Wood pavement	1.15
	Level macadam	5 to 3
(4)	Plank road	.9
	Cobble stones	1.75
(5)	Good dirt road 1.1	to to 2
(6)	Ordinary country road (dirt)	.2
(7)	Sand	.20

Q.-GRADES.

The tractive effort due to grades must be added to the tractive effort for a given road surface.

Example: 5 per cent. grade on hard level asphalt. Hard level asphalt 25 pounds per ton. 5 per cent. grade = 100 pounds per ton, due to grade alone. 100+25 = total tractive effort = 125 pounds per ton.

# IO .- WIND RESISTANCE.

Below 12 miles per hour the additional tractive effort necessary to overcome the wind resistance on heavy vehicles is comparatively small.

But on the light, high speed vehicles, when running at speeds above 12 miles per hour, the wind resistance becomes quite a large factor.

#### II .- ECONOMIC SPEED.

Taking everything into consideration, that is to say, life of engine, transmission, tires and maintenance of vehicle as a whole, experience shows that the following table is approximately correct:

ross Weight.	Type	Speed in
Pounds.	of Tires.	M. P. M.
1,500	Pneumatic.	20
2,000	Pneumatic.	20
3,000	Pneumatic.	18
4,000	Pneumatic.	16
2,000	Solid.	16
3,000	Solid.	15
4,000	Solid.	13
5,000	Solid.	11.
7,000	Solid.	9
10,000	Solid.	8
15,000	Solid.	7
20,000	Solid.	6
	12.—STOPS.	

The number of stops per mile will have a considerable influence on the energy consumption of a given vehicle.

# 13.-ACCELERATION.

It should never be too rapid; if it is, there is danger of damaging the engine or snapping a chain or gear.

It can be seen from the preceding items that there are a great many factors which influence the energy consumption, and, therefore, the performance of a commercial vehicle.

J. D. Siddeley, who for a number of years was general manager of the Wolseley Tool and Motor Car Company, Ltd., of Birmingham, England, has been appointed joint managing director of the Deasy Motor Car Manufacturing Company, Ltd.

# The Automobile Situation in Washington, D. C.

By H. H. BROWN.

Washington is an ideal city for the demonstration of the automobile for both pleasure and business purposes. Nowhere in the city is traffic ever congested. The streets and avenues are, without exception, more than ample for the travel on them, and, while the city cannot be said to be square shaped, yet, unlike New York, it spreads out in all directions, and through traffic is not confined to two or three main thoroughfares. Then, again, while numbered streets run north and south and lettered streets east and west, avenues running diagonally intersect the others every four or five blocks, so it is possible to take almost a straight line from point to point instead of following the usual two sides of a rectangle. The grades are easy and the streets are kept in fine condition at all times. This is rendered especially easy by the fact that Washington is almost entirely a residential city, and there is little or no regular heavy trucking to put the streets in bad condition. Again, owing to the somewhat southerly location of the city, traffic is very little impeded by snow or other weather conditions. ELECTRICS POPULAR

Perhaps the most striking feature of the automobile situation in Washington is the extensive use of electric vehicles, especially runabouts. It is said that there are more

Owing to the extremely wide streets there are no traffic regulations limiting the time during which a machine can stand in one place, nor are there any as to the side of the street on which the car shall stand. It is therefore customary not only to leave a machine unattended during shopping and business calls, but also during attendance at the theatre. In some places where many automobiles are left unattended for some time it has been the custom to back them up to the curb instead of running them alongside, as is generally done. About the only automobile traffic regulation which is strictly enforced is that which forbids the dropping of oil. Speed regulations are enforced by bicycle police, who have their wheels equipped with speedometers, but as most drivers show consideration for the users of the highway no considerate driver need fear arrest for what may be called technical violations of the speed law.

On arriving in the city of Washington one is almost sure to run across electric automobiles before leaving the train shed, as two electrically driven baggage trucks are in use in the terminal station. These were put in operation when the terminal station was opened for traffic, and from the engineering standpoint have been a success. As to just how successful they are from the

with this trouble the Senate office building was erected on B street, right across from the Capitol. To facilitate communications between the two buildings a subway was built between them. This subway is about 25 feet wide, with a raised sidewalk to one side, railed off from the roadway. The flooring of the subway is of cement, as smooth as the proverbial billiard table, but with a grade of about 2 per cent down toward the office buildings. The length is about one-eighth mile, and the line of the subway is slightly curved. It is heated by steam in winter and lighted brilliantly at all times with electric lights.

#### DESCRIPTION OF CARS.

The two machines used are electrics They are equipped with 5 horse power motors and batteries of twenty-four cells each. Their design is somewhat peculiar. as they are built especially for the service. There are two drivers' seats, one facing one way, and the other the other. The passenger seats are arranged longitudinally, vis-à-vis, there being one pair of seats for six at one end and another for four at the other, there being steps at both ends. The drivers' seats are located "amidships," the control being on the left. Two complete sets of controllers are in use, one for each seat. This, of course, makes the cars double enders, so that they can be driven up to either end of the subway and then returned to the other end without turning round



A MOTORCYCLE DELIVERY VAN WHICH MAKES FORTY MILES PER DAY ON A MILK ROUTE.



BRUSH DELIVERY SIMILAR TO THAT USED IN MAIL COLLECTION CONTRACT.

electrics used in the city of Washington than in any other city of its size in the country. Most of the electrics used are kept in public garages, and the price charged not only includes washing and polishing but also charging and calling for and delivering the machine to the owner at least once a day. Considerable business is also done by the garages in charging during the day electric machines which are kept at owners' private garages or stables during the night. This while the owners are attending to business in the city.

economic point of view would be hard to

CAPITOL SUBWAY CARS.

Another peculiar use of the automobile is as a sort of horizontal elevator in the sub-way which connects the Senate chamber with the Senate office building. There are a large number of Senate legislative committees which report on and revise bills brought up for action by both houses. Formerly these offices were scattered round in many buildings, and much valuable time was lost in going to and fro. To do away

At the Capitol end there is a platform which is level with the vehicle platform at the office building side. The steps are used, however. The normal seating capacity of the machines is ten, but during rush hours, when the Senate is opening or closing, as many as eighteen are carried. The machines are operated simultaneously, one being at one end and the other at the other. When one is ready to start the driver rings his bell, and they both start up simultaneously, or nearly so. Thus most of the time there is a machine ready to start



BELMONT GARAGE, ONE OF THE LARGEST IN WASHINGTON.

at either end. Two sets of batteries are kept in reserve; they are charged in the dynamo room of the office building, and in case of a battery running low it is a matter of seconds rather than minutes to change batteries. However, this hardly ever needs to be done during running hours, since the machines are capable of making about 40 miles on a charge, which is equal to upward of 300 trips

Property suitable for garages rents somewhat lower in Washington than in most other cities, and the cost of labor is also lower. The consequence is that the "elevator" garage is conspicuous by its absence. In most cases the garages are of one story only.

However, there are some of two stories, the upper story being used for offices, locker rooms, dead storage and repair shop. An example of this type is the Belmont Garage, which is built especially for the purpose, the walls being of brick and the flooring of reinforced concrete.

# WEEKING CAR EQUIPMENT.

A rather interesting piece of apparatus used in this garage is a wrecking car which was remodeled from a well known double opposed cylinder model of 1903. The tonpeau of the machine was removed and a large tool box was put in its place. This box measures about 4x21/2x2 and while in the garage is kept locked, employees being forbidden to borrow tools from this car under any pretext. The tool box contains all tools ordinarily used in the shop. besides several special tools and appliances. Among these are a couple of bogie trucks. These are equipped with 20 inch wheels and have a curved iron piece secured to a block on the axle by means of which they can be readily lashed to the springs of a disabled vehicle. Another special piece of apparatus is a spare wheel which is fitted with bushing so that it may be placed on any axle from which a disabled wheel has been removed.

Another feature of the car is a power winch. This is placed on the platform formerly occupied by the tonneau. To use the same the driving chain is disconnected from the rear axle and a special driving chain is connected from the countershaft sprocket to that of the winch.

For use in connection with this device, a block and fall are kept in the tool box. A minor feature of the equipment of this car is the use of portable stands for the searchlights and plenty of tubing by means of which they may be connected to the generator and be placed advantageously for furnishing light for a night repair job.

# MOTORCYCLE CARRIERS.

The use of the motor vehicle for commercial and public services purposes has in general progressed as well as in other cities of the same size. There is one line of taxicabs operated in the city, but these are not so much in evidence, since local conditions do not favor their use as much as in more cosmopolitan cities, such as New York. There are quite a number of sight-seeing cars in use and also delivery wagons of the usual types. Perhaps the most interesting phase of the commercial side of the automobile situation in Washington, however, is the use of the lighter forms

of vehicles for mail collection and light parcel delivery.

Several light motorcycle delivery vans have been in use for some time in various lines of business, some having been in use for a period of as long as two years. They have been used for the collection of mails by the Post Office, for collection and delivery of books by the Public Library and by florists, caterers and book stores-in some cases for special emergency delivery and again for regular work. Most of these machines average about 40 miles per day and are capable of something like 60 miles on one gallon of gasoline. Perhaps the best idea of the economical operation of these machines will be obtained from the fact that the agent of one of these makes stands ready to furnish gasoline and all supplies including garaging and tires, in fact everything except repairs necessitated by an accident, on a yearly contract at \$18 per month, the only condition being that one man only be employed to operate the machine, so that it will not constantly be in the hands of inexperienced men. The fact that none of the purchasers of the machines have taken advantage of this offer shows that these figures have been found by experience to be more than ample.

This same agent recently made a proposition, in fact a bid, to the Post Office to furnish a machine on a yearly contract at \$360 per year. This included rent of machine and all supplies, on a route of 40 miles per day. He also agreed, in case they made a contract for four machines, to furnish or keep in stock an extra machine to be used when any of the other machines was laid up for repairs or for use during the rush seasons.

# MOTOR MAIL COLLECTION.

Perhaps one of the most interesting phases of motor vehicle service in Washington is in the collection of mail from mail boxes, as this service is also very hard on all parts of a car, owing to the numerous stops made in a given time. The Brush-Nichols Company have a year's contract



AUTOMOBILE COLLEGE OF WASHINGTON.

with the Post Office Department to furnish three machines for sixteen hours per day with driver to do such work as may be required of them. At present these machines are in use at three stations for mail collections. They make an average mileage of 102 per day and collect on an average over 100 boxes per trip. They each average four trips per day. A collector accompanies the driver and rides on a wide step in the rear of the machine. Between boxes he empties his bag into larger bags inside the body. It is claimed by the post office authorities that one of these machines does the work of twelve carriers either on foot or on a wheel. The machines are equipped with solid tires.

It has been found that the average cost per machine under these conditions of service is about \$200 for repairs and replacements, including cost of tires. This service is very severe on a car. It has been estimated that the average business wagon makes an average of only about seventy-five stops per day as against about 500 in mail collecting work. Then again, in many cases the machines are overloaded. The load capacity guaranteed by the makers is 500 pounds.

The contract price to the Post Office for the use of the three machines with drivers is \$14,600 per year. At first this may seem a trifle high, but it should be remembered that there is a penalty for delays in collections and that a fourth wagon is kept in reserve for use when one is undergoing repairs. In fact, there are two extra machines available for special rush season work.

There are also quite a number of these machines in use for various commercial delivery purposes, in the service of florists and butchers, and these are giving satisfaction. Considering that they cost about the same as a good horse and team the work which they do would seem to be very creditable.

### AUTO COLLEGE.

As far as could be ascertained there is only one automobile school in Washington. This is known as the Washington Automobile College. The proprietors of this school deal in second hand automobiles. This gives the students a chance to look over a variety of machines. Their lecture or class room is equipped with a stripped chassis and there are also a number of coils, carburetors and various parts which are used to illustrate the points brought up during the theoretical instruction.

# New Photographic Device for Determining Vehicle Speeds.

By WALTER H. HILDERRAND.

No objection to the perfection of the motor driven vehicle stands out as prominently as the dread felt by the public toward over-speeding automobiles. Stop watches, with tapes at quarter mile intervals, have been employed in upholding speed

ment have been imposed for reckless driving. But the method of conviction, based as it is in many instances upon the word or judgment of a single deputy, has proven universally unsatisfactory.

An instrument which eliminates this difficulty has been found by Drs. Herbert T. Kalmus and Daniel F. Comstock of the physics department of the Massachusetts



SPECIMEN PHOTO TAKEN BY AUTO SPEED RECORDER.

Institute of Technology, in their researches toward the establishment of a mechanical means for recording the velocity of a moving object. The photo speed recorder finds its most novel application in the conviction of auto speeders, and several fines have already been imposed in Boston courts, based upon the evidence rendered by the photographs.

Two cameras enclosed in a single cover take instantaneous exposures of the automobile, one approximately a second after the first. During the interval, the machine has traversed a certain distance which may be readily calculated from the two photographs, following an established rule relating to lenses.

The relation of the size of an object to its image is known to be exactly equal to the relation of the distance of the object from the lens to the distance of the image from the lens. In the computations, the size of the object is taken as the wheel tread of the automobile. The size of its image is readily measured from the photograph by means of a steel scale graduated to hundreths of an inch, and the distance of the image from the lens, which corresponds to that of the plate holder from the aperture, is accurately determined for each instrument. With this data it is a simple matter to find the distance of the object from the camera at each exposure; the difference in the two results gives the distance through which it has moved.

To determine the exact time of the interval between exposures, a chronometer is placed inside the instrument directly in front of the plate holder, an image of the moving hand appearing against a fixed dial on each photograph. One half revolution of the pointer indicated exactly one second, and the time interval may be read to a thirtieth of a second by noting the difference in dial setting. Having found the distance and the time, the velocity is established accurately by this method to within a fraction of a mile per hour.

Purely mechanical in operation, the camera need only be pointed at a moving object and a lever pressed at its side. Automobilists and officials alike should welcome an innovation which eliminates all personal element from an arrest for reckless driving shows the number and surroundings of the speeding machine, and in many cases even records its occupants.

# Registrations in California.

During June of this year 885 motor cars were registered at Sacramento in the office of the Secretary of State of California. In May there were 938 registrations, and in April, the record month, there were 953. The number of registrations is, however, higher than in June of any year since the law went into effect. In June, 1905, there were 498 registrations; in June, 1906, 313; in June, 1907, 561, and in June, 1908, 519. During the first six months of 1909 there were 4,517 registrations, as against 3,010 for the first half of 1908. The total registration for 1908 was 5,558.

During June, 1909, there were 231 transfers of motor vehicles, the number in May having been 180. During the first six months of the year there were 732 transfers, while for the same period last year there were 409. The total number of transfers for 1909 was 891. One hundred and seventy-three licenses were granted to chauffeurs during the month of June.

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# The Pros and Cons of Offset Cylinders.

The practice of offsetting the cylinders relative to the crank shaft is spreading in this country, and for good reasons. We believe that it is generally understood that the advantage of offsetting is that it reduces the side thrust on the cylinder wall during the power stroke, thus saving power and reducing the wear of the cylinder bore. It is true that offsetting increases the side thrust on the cylinder wall during the compression stroke in the same proportion, but as the piston head pressure during the compression stroke averages only about onefourth as high as during the power stroke, the gain far outweighs the loss. There can be no doubt that the offset cylinder motor possesses a higher mechanical efficiency than the "straight line" motor, other things being equal. The difference, of course, can amount to only a few per cent., and could herdly be expected to be clearly discernible in indicator diagrams or the results of brake tests

We have never heard a plausible argument against the practice of offsetting, except that it slightly disturbs the balance of the moving parts. Considerable importance

has been attached by some writers to the fact that a certain English firm has discarded the principle. It may be said, however, that this firm, whose product is distinguished by high grade workmanship, has always been regarded as several years behind the leaders in engine design, and so this particular move on its part is not likely to make any great impression among engine designers. Moreover this firm now uses a special type of engine, and even though offsetting were proved to be undesirable for that type, it by no means follows that it is also of no value for engines of the conventional type.

# A Revival of the Combination Power System.

The combination system of automobile propulsion, by means of electric motors receiving current from a gasoline engine driven generator carried on the car, is recently being taken up again in connection with commercial vehicles. The system found much favor with inventors in the early years of the industry, and many different combinations were worked out, some including also a storage battery. The system never gained a foothold, but it is to presumed that many of the failures were due to the crudeness of the various elements, notably the gasoline engine, at the time.

Recently one of the big express companies operating in New York city has transformed a number of its electric trucks by providing them with gasoline engine-generator sets to take the place of the storage battery, and we notice that several Western firms are preparing to place trucks with such a power system on the market. The object is, of course, to eliminate the weakest features of both the gasoline truck and the electric truck, and in a way combine their advantages. The most delicate part of the gasoline truck, especially for operation in crowded thoroughfares, is undoubtedly the change gear. The constant stopping and starting is very hard on the gears, and they wear out rapidly. The sliding pinion type of gear requires more or less skillful handling, and necessitates the employment of more expensive drivers than would otherwise be necessary, and the other types of change gears also have serious shortcomings when applied to this work. The weakest part of the electric truck always has been the storage battery. It is very heavy, limits the radius of action, and requires frequent washing and renewals.

The relative output of gasoline engines has been so much increased in recent years that a 30 or 40 horse power direct connected generator set now occupies only a relatively small space. The engines also are much more reliable in operation than formerly, and one of the former important advantages of the storage battery is being overcome. The combination system affords the same flexibility of drive as the electric system. There being no positive mechanical connection between the engine and the car, the former is not subjected to road shocks to the same extent as where a mechanical change gear is used. The speed control is also simpler, being similar to that of the electric truck.

The combination truck would seem to have its most promising field in dense traffic and where there are not too many steep grades. Its smoothness of speed control and flexibility are of the greatest advantage in work in crowded thoroughfares. In very hilly districts its relatively greater weight as compared with a gasoline engine combined with a mechanical drive would be a disadvantage. As the ratio of gear reduction from the electric motors to the driving wheels could not be changed en route, very powerful motors would be required to carry full loads up the hills. In New York city the conditions are evidently favorable, and the experiment of the express company may well prove a success.

# Greater Comfort for Drivers.

Most of the 1910 models have been constructed with the idea of making them as comfortable for the operator as possible. Probably control systems have been somewhat simplified so that fewer motions are needed than formerly, but the principal improvements have been along the line of reducing the effort required to make the necessary motions.

To this end a great deal of care and patience has been used in laying out the hand levers for brake and gear control, so that the handles are in the most comfortable position possible. In some cases the movement of the levers has been reduced so that they are easier to reach in the extreme forward position, and there is more clearance for the hand when they are pulled back nearest the seat. Pedals have also been made easier to operate by placing them in more convenient positions, and also by increasing their leverage so that less strength is required. The more convenient location has been obtained by making the pedals ad-

justable in length. By proper adjustment the foot pads may be brought into the most comfortable location for a long or short legged driver.

The most important tendency toward simplification consists in combining the brake and clutch control in one pedal. Where this is done the slight movement required for the clutch may be secured by a cam, so that when the pedal is pressed further forward to apply the brakes the clutch spring is not compressed any more. This cam movement saves the clutch spring, since it is only compressed enough to release the clutch, and relieves the driver from part of the effort often required with single pedal control.

Steering gears are not materially changed. Rather larger steering wheels will probably be used on the average, however, and the columns will be set at a greater angle so that the gears will be more comfortable to operate.

On the whole, we may say that 1910 cars will be the most comfortable to operate of any which have yet been produced. For while in former years the control systems have been carefully worked out on many of the higher priced machines, the coming season will be the first to see such refinements of design applied to all classes of automobiles.

# Recuperation of Our Foreign Automobile Trade.

The past few months have shown a remarkable increase both in the imports and exports of cars, as compared with the same months the previous years. The growth in imports is especially pronounced when numbers of cars are considered instead of values, the average values having materially fallen. Thus, only a few years ago the average declared value of foreign cars imported here was around \$3,500. cars imported in June last had an average value of only \$1,880. It must not be concluded from this, however, that the foreign manufacturers now sell the same cars for little more than half the price they asked only a few years ago. The cars imported are, on the average, of much lower horse power than formerly, and, besides, a considerable number of taxicabs are included in the list. The average imported car now has only a very slightly greater declared value than the average American exported car, the average value of exported cars for June having been \$1,810.

The growth in automobile imports is

readily explained by the great demand for cars in this country this past spring, which taxed the capacity of practically every maker. That American manufacturers, in spite of the demands of the home market, which naturally turned their attention away from foreign fields, should nevertheless have found greater outlets abroad is most encouraging. During June more than four times as many cars were exported as were imported, the aggregate value of the exports being slightly more than four times those of the imports. The automobile movement seems to have taken a strong hold in the Canadian provinces the past year, and as this market is very largely controlled by the American industry it has strongly boosted the export figures. The United Kingdom, too, in spite of the general depression in the motor trade in that country the past year, took a greater number of cars from us than the previous year. The facts about the enormous production in this country are becoming known, and that we are producing nearly twice as many cars a year as all the European states together certainly tends to disprove the much repeated allegation that we are behind Europe in automobile matters. Besides, figures talk. Quantity production enables the large American manufacturer to produce cheaper than his European rival with his relatively restricted outlets. If the customs returns show the average value of exported cars to be only a little less than that of the imported ones, it is a fair presumption that the American cars were on the whole of larger and more powerful type.

The new tariff which went into effect last week leaves the duty on automobiles unchanged, and will therefore not affect the development of our foreign auto trade, As there was at no time any likelihood of any important change in the rate of duty on automobiles it is not likely that the recent increase in the volume of imports was in any way due to the impending tariff revision, but was entirely due to an increase in the demand for foreign cars.

# Economy in Shipping Automobiles.

A number of manufacturers have been making a practice of shipping cars parely disassembled to foreign countries where there is some saving in the duty from shipping this way. This has been customary in shipping to Canada, where a number of as sembling branches have been established. This practice of "knock down" shipping

has not always been successful, for it has been found in some instances that the cost of assembling in the branch was so much greater than that at the factory that the saving in duty and transportation was wiped

It is evident that the shipments to an assembling branch must be sufficiently large and regular to allow of the assembling force being kept busy all the time. Under such conditions the cost of assembling should be little greater than at the main factory.

Some of the large makers evidently believe that conditions in the West and Southwest now promise a sufficiently large and sustained volume of business to warrant the shipping of cars in the knocked down condition, for the establishment of two assembling branches in that section of the country has recently been announced. Recent developments in motor car design are in the direction of economical assembling, and it is evident that as export trade increases and the number of cars shipped to parts of the country remote from manufacturing centres becomes greater, much can be done to reduce the volume occupied by the machines when shipped in the knocked down condition.

Like most other questions of economy in the manufacture of motor cars, all these possible savings are closely related to quantity production; for the cars assembled at a branch must be as carefully inspected and adjusted before delivery as though they were put together at the home factory, to give equal satisfaction to customers.

# An Accident Shop Superintendents Should Take Notice Of.

One of the storchouses of the factory of the Olds Motor Works in Lansing collapsed last Saturday, owing to the pressure of steel castings piled against the walls. The walls were of brick and the weight of the castings forced them outward, allowing the roof to fall. There were three workmen in the building at the time of its collapse. Of these, one was so badly crushed that he died shortly after, and another was so severely injured that his chances for recovery are slight. The third workman was unhurt, being blown through an open door by the rush of air caused by the falling roof.

# Coming Events.

August 17-Cheyenne, Wyo., Track Meet, A. C. of Cheyenne.

August 31 or September 30—Milwaukee (Wis.)
Annual Orphans' Outing, Milwaukee A. C.
September 6-11—Lowell (Mass.) Annual Motor
Carnival, Lowell A. C.

September 15—Denver (Col.) Start of Flagto-Flag Race to Mexico City, Denver M. C.

# Is a Runabout Type Developing?

By F. E. WATTS.

While gathering material for the article on the high wheel automobile which appeared in the issue of June 30, 1909, the writer began to wonder if the high wheel and the low wheel runabouts were not approaching a common type. To ascertain roughly if this were not so, Table I was prepared from the data of a number of 1909 runabouts costing \$1,000 and under.

The averages given in the last line of the table for high wheel cars are those obtained from the article referred to above. A comparison of the averages for the two classes shows that the pneumatic tired car is somewhat longer and heavier, and just a little more horse power, though not quite so much in relation to the weight, and costs a little more. Shaft drive and four cylinder, water cooled motors are the favorite constructions. The sliding gear and the planetary are the favorite speed changing devices.

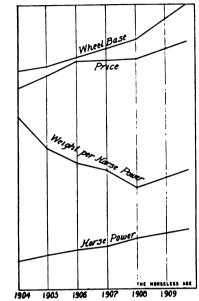
In both classes of cars the development is somewhat similar; both have grown longer and heavier; in both the motors are increasing in power, and, strange to say, in both this season shows an increase in the weight of the empty car per horse power.

The latest tendency in both classes is toward the four cylinder motor and the shaft drive. And the principal divergence is in the wheels and tires, and in the tendency toward air cooled motors on the solid tire cars, while water cooling is almost universal on the pneumatic tired machines.

Reports on 1910 models of high wheel autos have not yet begun to come in, but low priced, pneumatic tired machines, whose specifications have so far been published, show a decided increase in size, power and wheel base. Their wheel bases are about 100 inches, and the average horse power will run well toward 25. Probably these features of the high wheel cars will show an increase, though not so marked.

Present tendencies are thus seen to be

away from the runabout and toward a combination type of vehicle large enough to carry four people, the two rear passengers being carried either in bucket seats or a seat with low continuous back. Manufacturers



CURVES SHOWING YEARLY AVERAGES FOR LOW WHEEL RUNABOUTS.

generally build what is easiest to sell, so it is evident that the greatest demand is for an ambitious imitation of the high priced car. There are no present indications that this demand will grow smaller, but it would appear reasonable to suppose that the cars promised in 1910 would satisfy its every requirement, so far as size is concerned, and that the cheaper cars of the future are likely to be smaller rather than larger.

A glance at the table will show but one runabout which is designed for economical use for business purposes, the Brush. This car and the single cylinder Cadillac, the manufacture of which will very likely be discontinued, have proved very economical in the hands of the average user. The reason for this is their comparatively low power, which makes them slow speed machines. The ability to go fast, or the power to handle four passengers at a lively gait, is demanded by a large class of users for pleasure purposes at the present time, and their demand is developing the types which the tabular figures show. In the high wheel machines, however, considerable power may be demanded so that the car will pull well through heavy roads rather than from considerations of speed. But no matter what purpose it is required for, power and weight increase the operating cost, so there is bound to be a renewed interest in the smaller car at a later date.

We may conclude, then, that from present indications the small American cars of both classes are approaching a compromise type, which will be somewhat similar for both classes—it will be suitable either for a runabout or a four passenger machine for light touring. While this machine will be just what a large class of users want, there remains a market for a smaller car, which is likely to be only partially supplied for some years to come.

The following table shows the average dimensions for runabouts for some years past:

		Average Wheel		FOR LOW W	HEEL RUNABOU	т\$.	Pounds
Year.	Price.	Base.	Tread.	Tires.	H. P.	Weight.	Per H. P.
1904	\$675	731/2	531/2	28.5×3	9.5	1,111	116.9
1905	719	75		28.2×2.9	11.48	1,089	94.9
1906	768	77	54 · 3	28.6x3	13.19	1,124	85.0
1907	770	81	55 · 4	28.9x3	14.2	1,139	80.2
1908 (Estimated).	775	84	56	30 X3	17.0	1,150	68.o
1909	810	91	56	30.2X3.2	19.0	1.415	75.0

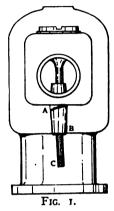
		Wheel		IABLE I.—	DATA OF 1909	Bore and	KUNABOU	13.	Pounds	Change	Final
Make.	Price.		Tread.	Tires.	Motor.	Stroke.	H. P.	Weight.	Per H. P.	Speed.	Drive.
Lambert	\$800	95		зохз	Opposed.	5 X4	20.0	1,350	68	Friction.	Single chain.
Maxwell, A	500	82		28x3	Opposed.	4 X4	12.8	1,100	86	Planetary.	Shaft.
Maxwell, L D	825	84	cars.	30×3	Opposed.	432×4	16.2	1,150	71	Planetary.	Shaft.
Hupmobile	750	86	-	30×3	4 cylinder.	314×334	16.8	1,100	66	Sliding.	Shaft.
Cartercar, H	1,000	100	all	32×3	4 cylinder.	4 X4	25.6	1,800*	70	Friction.	Shaft.
Buick. 10	1,000	91	5	30×3½	4 cylinder.	314×314	22.5	1,550	69	Planetary.	Shaft.
Cameron, 14	900	96	-	30×3	4 cylinder.	378×31/2	24.0	1,200	50	Clash.	Shaft.
Ford, T	825	100	ches	30×3	4 cylinder.	33/4×4	22.5	1,200	53	Planetary.	Shaft.
Mitchell	1,000	02	<u>.</u>	32×3½	4 cylinder.	4 ×4	25.6	1,800	70	Sliding.	Shaft.
Reo		96	26	32×3½	Opposed.	434×6	18.0	1,700*	95	Planetary.	Single chain.
Middleby	850	108		30×3½	4 cylinder.	4 ×4	25.6	1,800	70	Sliding.	Shaft.
Brush	550	74	no	28×3	r cyl. vert.	4 ×4	6.4	900	140	Planetary.	Side chains.
Cadillac	800	82	About	30×3	1 cyl. hori.	5 ×5	10.0	1,600*	160	Planetary.	Single chain.
Luverne, D	750	84	•	32×3½	Opposed.	5 × 5	20.0	1,550	73	Planetary.	Shaft.
Average	\$810	91		30.25×3.18		4.2X4.02	19.0	1,415	75		
Largest	1,000	108		32×31/2		5 x6	25.6	1,800	160		
Smallest	500	74		28x3 Aver	AGES FOR 1909	3¼×3⅓ High Wheel	6.4 Cars.	900	50		
Abou	t \$700	86		38x1 1/2 42x1 1/2	}	4¾×4%	18.0	1,213	68		•

# Maintenance and Repairs



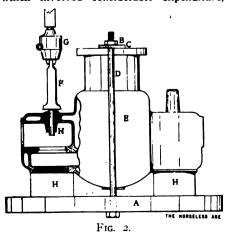
# Restoring a Broken Valve Guide. By Oliver Light.

A certain motorist of the writer's acquaintance recently had an accident which at first sight seemed to necessitate a costly replacement, but after closer investigation a very practical repair was made at comparatively slight cost. In attempting to remove a slightly bent valve, which had stuck in its guide, for inspection and grinding, the valve stem guide bushing was sev-



ered from the valve chamber of which it formed an integral part, as shown at A, Fig. 1. Through lack of knowledge the motorist was put to a certain expense which would never have been incurred had he intrusted his work to a capable machinist. To straighten the bent valve stem (exaggerated in the sketch), a sharp blow with a moderately heavy hammer was directed at the end C in the direction of the arrow, and, as nothing had been placed at the end of the valve stem guide to take the force of the blow, the cast iron guide broke off very close to the valve chamber. As must be evident, the steel valve stem was able to exert considerable leverage at the point A, especially when the guide had worn appreciably.

After being told by the agent of the car that a new cylinder was the only remedy, which involved considerable expenditure,



the motorist took the writer into consultation, to see if the cylinder, otherwise in perfect shape, need be replaced. There was too little of the guide left in the interior of the valve chamber to insure accurate seating of the valve, and the engine operated very unsatisfactorily at anything but low speeds. The writer applied a new bushing or guide to replace that broken. and while there can be no claim for the exercise of any great ingenuity or original. ity in this method of making a repair, it is believed that the manner in which it was accomplished may be of some interest to those not specially skilled in "patchwork" repairs.

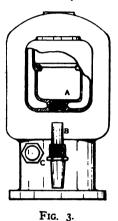
The first operation was facing off the irregular metal on the bottom of the valve chamber, which was done by a simple facing tool as shown at Fig. 2. This was forged from a piece of tool steel. The lower portion was turned 7-16 inch in diameter, and the upper part so that it would go into the chuck of a back geared drill press. As the guide hole for the stem was worn considerably (having been originally about 36 inch in diameter), the hole was first cleaned out with a 7 inch drill, to form a guide for the lower portion of the facing tool. The cylinder E was firmly clamped to the drill press face plate by means of two long through bolts D and the strip of steel bar C, which extended across the mouth of the cylinder, and was held in position on the parallel blocks H by the nuts B. After the metal had been removed from the bottom of the valve chamber, which was faced flush, the cylinder was reversed, and again clamped in position. Then the facing tool was used till all of the projection H had been removed. An 11-16 inch drill was then placed in the chuck G and a large hole drilled through the metal at the base of the valve chamber. following the  $\frac{7}{18}$  inch hole as a guide. The cylinder was again clamped in the position shown in Fig. 2, and, using a centre in the chuck bearing against the depression in the top end of a 34 inch 32 thread tap to insure a straight thread, the hole was tapped out. turning the tap with a spanner placed on the squared portion, the chuck being fed down as the tap progressed in the hole.

The next operation was turning up a suitable guide, which was done in a lathe. using a piece of bronze bar stock which was available. On this was left a substantial shoulder, and a greater length of threads than had been tapped into the valve chamber metal was cut on the bushing, in order that a check nut could be employed to make a sound job. The bushing was not bored, as there was some chance that the hole A, Fig. 3, had not been bored out true, which would throw out the valve seating. The bushing is shown at B, Fig. 3. and the check nut at C.

The threads on the bushing B had been cut a little larger than those in the hole A, and the bushing was screwed in place with but little difficulty by the use of a large spanner, the check nut being applied

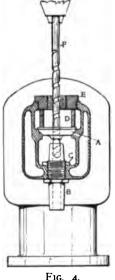
with a socket wrench from the top. To prevent backing out, the metal protruding above this was upset with a centre punch, this making a very strong construction; in fact, of greater resistance to both wear and shock than the original cast iron bushing which it replaced. This bushing is shown in position in Fig. 4.

The method employed to insure that the hole through the guide would be in the proper relation to the valve seating is also of interest. A spare valve was at hand, so the old one with the bent stem was discarded. The head was cut from this, after it had been thoroughly ground in to a correct seating, and a portion of the stem. where it flared out to join the head and



obviate an abrupt bend, was left on. The valve head was accurately centred in the lathe chuck, and the centre mark, which had acted as a support for it when it was first machined from the forging, formed an accurate guide by which a 36 inch hole was drilled exactly through the centre of the head. The head was then held in position on the bevel seating by means of a piece of tube, accurately faced off at both ends, which was in turn retained by the valve cap. The valve cap E was tapped for a spark plug, and as the tube D held the valve head A positively in place, a guide was obtained for the twist drill F, and the 36 inch hole for

the valve stem bearing was drilled so ac-



F1G. 4.

curately that the new valve had a perfect bearing at all points on the seating.

While there is no reason to doubt that a very satisfactory job would have resulted if the thread had been eliminated and the bushing made a driving fit into the bottom of the valve chamber, which had a thickness of metal of about 5% inch, it appears to the writer that the more positive retaining power of the thread and checknut amply compensated for the increased expense in machine work. This job took seven hours, and cost but \$4.50, which included the bronze stock. This material was used because it was handy. The ease with which it may be machined, and its strength, about equal to that of mild steel, which obviously machines harder, were other advantages in its favor. In presenting the illustrations no attempt has been made to show proportions, it being the writer's object to show principles and their application more than actual construction.

# Breaking of Poppet Valves: Symptoms, Effects and Temporary Repairs.

BY THE TROUBLE MAN.

Thanks to the better proportioning of valves, the use of materials better adapted to the purpose and the adoption of cam profiles which secure seating at low velocities, the breakage of valves, in service, is now much less common than formerly. The adoption of mechanically operated inlet valves has also tended toward this condition, breakages being much less common with this type than with valves opened automatically by engine suction and seated by springs. A similar course of refinement has rendered valve springs comparatively immune from sudden failure.

However, both valves and valve springs do occasionally break on the road, and it is well to know what to do when this happens.

# INLET VALVE.

A sudden and almost continuous popping in the carburetor is the usual indication of a broken inlet valve and when this is noticed the motor should at once be stopped, if indeed it does not stop of its own accord. Prompt shutting down is extremely advisable, for there is a chance that if the motor is kept running the head of the valve or a portion of it may be drawn through the inlet port into the cylinder, and be caught between the piston and cylinder head, on the up stroke, fracturing one or both of these parts. Some engines, however, have bridged inlet ports which tend to prevent the drawing in of the valve and the consequent occurrence of such an

If an inlet valve has actually broken the cylinder in which it is located may readily be identified by its lack of compression, when the motor is cranked over with the spark shut off. The removal of the cap over the suspected valve will finally settle the question as to whether the valve is

broken or whether it has only stuck in an open position, through the breakage of the spring or binding of the stem in its guide.

BROKEN SPRINGS.

Spring breakage is perfectly obvious upon inspection, and if the valve stem is stuck it is necessary to work some lubricant into the guide or even to remove the valve and smooth its stem by draw filing.

If a new valve or spring is required and the spare parts are at hand it is of course necessary to remove the key holding the spring and to withdraw the broken valve through the valve chamber opening above it. This sounds easy, but it is by no means a pleasant piece of work when the engine is hot, especially as the valve springs used are generally very stiff and unmanageable, and it is often no easy matter to withdraw the key which frees the spring. Special valve spring tools are made which greatly facilitate this operation, and it is well to be provided with one. The breakage of an exhaust valve of a force cylinder engine is generally indicated by the loss of power due to the failure to operate of the cylinder to which it belongs and sometimes muffler explosions occur.

#### EFFECT ON OTHER CYLINDERS.

Lack of compression upon cranking will determine in which cylinder the trouble exists. If the breakage of an inlet valve only affected the cylinder to which it belongs it would generally be possible for one to proceed to his destination by the power developed by the three undamaged cylinders. Unfortunately, a broken inlet valve frequently puts the whole engine out of commission. If the inlet valve of No. 1 cylinder breaks this cylinder will be open at all times to the inlet manifold. When its spark occurs the cylinder is full of gas, not compressed, to be sure, but explosive, and the combustion extends freely through the manifold and down to the carburetor, filling the intake piping with burnt gas. The inlet valve of cylinder No. 2 may be open at the time of the explosion in No. 1, although it is nearly at the end of its suction stroke. and its charge is likely to be fired prematurely by the explosion above noted.

When the exhaust valve of cylinder No. I (the defective one) opens, the exhaust manifold and the inlet manifold are in connection through cylinder No. I. Cylinder No. 4 is drawing its charge at this time, and it draws partly through the inlet manifold and carburetor and partly through the inlet manifold cylinder No. I and the exhaust manifold. The result is a foul charge which may be below the limit of inflammability.

Cylinder No. 3 is drawing its charge during the power stroke of the damaged cylinder (No. 1) and there is likelihood that its charge will be fired by the flame of the explosion in No. 1, if indeed the gas drawn by No. 3 is not too much fouled to burn. If one is unfortunate enough to be unprovided with the required repair parts it may become necessary to put the engine into some sort of running condition in order to reach a repair shop.

CUTTING OFF IGNITION.

If the ignition of the cylinder which has the broken inlet valve (No. 1) is cut off, there will be no explosions in the manifold and carburetor, and cylinder No. 2 will operate normally, as will cylinder No. 3. The spark plug of No. 1 should not be removed, in order to bring this about, as then the intake system would be open to the outside air through the plug hole and the charge drawn by the cylinders would be too weak to be fired. To cut off the ignition from the defective cylinder, if vibrator coils are used, a piece of paper should be placed between the vibrator points of the coil which sparks this particular cylinder. If a high tension magneto be the current source the high tension terminal should be detached from the plug and fastened to some grounded portion of the engine.

Cutting off of the ignition from the defective cylinder will not, however, improve the operation of cylinder No. 4, which draws exhaust gas through cylinder No. I on its suction stroke. This can be prevented, however, if the cylinders have individual inlet connections, by loosening the intake pipe connection of the damaged cylinder and slipping a piece of cardboard or tin under the flange so as to cover the opening of the intake branch and then setting up the flange tightly. The damaged cylinder will then be entirely cut out, as it were, and will not affect the others. After this is done the spark plug may be removed from this cylinder in order to do away with loss of energy caused by compressing the gas in cylinder.

As a rule valve breakage consists in the fracture of the head or its separation from the stem. When this occurs the head can be removed from the pocket to guard against possible mechanical damage and the stem left in place. If, however, the stem has to be removed, the hole which forms the guide must be tightly closed with a wooden plug, firmly driven in. Unless this is done the air leak permitted will weaken the charge so that the motor cannot be started.

The breakage of an inlet valve in a two cylinder opposed motor will usually not prevent the other cylinder from running, if ignition is cut off from the defective one.

EFFECTS ON FOUR AND SIX CYLINDERS.

The results of breaking an exhaust valve on a four cylinder engine are not so serious as those arising from the failure of an inlet valve. The operation of the other three cylinders is not much affected. It may be as well to remove the spark plug from the inoperative cylinder, however.

In the case of a six cylinder engine the breakage of either an inlet or an exhaust valve disturbs the operation of other cylinders than the one having the defective valve. If the repair parts are not at hand the absolute cutting out of the defective cylinder, by blocking the passage to the broken valve, is required. It is best always to have an extra valve and spring in the repair kit, as driving with one inoperative cylinder is far from pleasant.

# Shop & & Equipment



# Novo Superior Steel.

Most of us who are interested in shop methods remember the revolutionary increase in the speed with which stock could be removed which followed the introduction of the "high speed steels" a few years ago. So great was the increase in feeds and cutting speeds that many machine tools had to be redesigned to meet the new require-

A short time ago some of the pioneers in the introduction of "air hardening" or "high speed" tool steels announced that they had perfected new brands whose performance put the old ones in the shade. Typical of these new steels is the "Novo Superior," handled by Hermann Boker & Co., of New York and Chicago. This is claimed to stand a considerably higher cutting speed than the older steels, varying from 50 to 60 per cent... higher on soft material to about 25 per cent on hard material. It is said to cut harder material than any other steel yet produced. Under the same conditions of feed and speed a tool of this new material is claimed to run from four to six times as long as one made from other steels without need of grinding. These performances have been shown by public tests.

The steel should be forged at a very light red or yellow heat. After rough grinding the tool is slowly heated to a dull red, then the nose is quickly brought to a full white welding heat and quenched in thin oil, For cutting specially hard material cold water or brine is used in place of the oil.

The experienced shop superintendent will be rather slow to believe in the cutting qualities claimed for these new steels until he has seen them equaled in his own shop. But reports from various factories indicate that the public tests have been verified in private use. If these reports prove true the use of chrome-nickel and other alloy steels for automobile parts may become more common.

Some Grinder Improvements.

The latest grinders made by the Pratt & Whitney Company, 111 Broadway, New York, contain some novel devices designed to aid in getting out work more rapidly and more accurately. One of these is a new form of back rest, which they term "the self feeding and unyielding back rest." As shown by the illustration, this supports the work at an angle of about 45 degrees. The jaws are adjusted to fit the work when it is largest and are automatically fed in as the work is ground to size, maintaining a uniform contact. In the earlier models this was accomplished by horizontal and vertical screws operated by coiled springs. In the model shown, however, a single feed



PRATT & WHITNEY SELF FEEDING AND UN-VIELDING RACK REST.

at an angle is apparently used, and this is operated by a weight. The back rest jaw is automatically locked in the position to which the weight feeds it by the roller moving in the slot in the arm above. A series of jaws are provided for different sizes of

It is claimed that by the use of this back



PRATT & WHITNEY SIZING DEVICE.

rest the grinding wheel is kept true much longer than ordinarily, and hence wears longer, since but little of the material of the wheel is wasted.

Another improvement is the automatic sizing device. The grinder has two feeds, a coarse feed for roughing nearly to size and a fine feed for finishing. When the piece is roughed near enough to size the fine feed is automatically thrown in by an electrical device, operated from an arm which rests upon the work. Traveling at this fine feed the wheel is automatically fed in until a micrometer screw, which has previously been carefully adjusted, makes a second contact. This second contact stops the radial feed. It will be seen that the work will be ground to the desired diameter its entire length, no matter how much the wheel wears. Also that any number of pieces can be turned out in duplicate.

If it is desired to grind only a few pieces of a given size, so that it would not pay to use the sizing device, the machine can be operated with mechanical feed, similar to other grinders.

# A Unique Slabbing Job.

It is sometimes possible to do extra work on a piece without taking any extra time. A good example of this is the attachment





REAR VIEW, SHOWING DRIVE. SLABBING ATTACHMENT FOR NATIONAL ACME AUTOMATIC SCREW MACHINE.

plainly shown in the accompanying cuts. It was furnished the Cadillac Motor Car Company by the National-Acme Manufacturing Company, of Cleveland, O., and was attached to their No. 53 automatic screw machine.

The piece on which the slabbing is done is threaded at one end, and the slabbing is performed while the piece is held stationary for the threading, hence it takes no additional time. The milling cut is made by two straddle mills on a vertical shaft, which is driven by bevel gears from a horizontal shaft that carries the driving pulley. This last is driven from a special countershaft in the machine shown, but could be driven direct from the die spindle gears. The attachment is fastened to the top of the cut off tool slide. It is stated that these pieces are made at the rate of 53 an hour.

# Automobile Insurance.

By J. E. JENNINGS.

At one time the insuring of automobiles was looked at askance by insurance companies. There was a day when no stock company would write automobile risks. The underwriters who took these risks made no money on the business or suffered heavy losses. This is no longer the case. as the number of strong companies that write this form of insurance is steadily on the increase, and, moreover, they have extensive agency connections that keep them in close touch with that part of the public that goes in for automobiling and wishes to lose nothing by its passion for the new means of locomotion, if insurance will enable it to do so.

Formerly a foreign institution, which balks at no risks if there is a possible chance of making money, was the mainstay of the automobilist who was looking for insurance from peril by land-fire or casualty or collision. With the improvement of the automobile came less danger, or less chances of the underwriter losing, and the number of those owning machines who determined to be at no loss if there was a possibility of arriving at that happy end also increased materially. Gradually the home (or American) companies came into line, determined upon sharing the profitable field with the foreign insurance concern (the London Lloyds), until now there is a very respectable array of talent cultivating a paying field. The names of some of these companies were recently printed in THE Horseless Age, with a list of their rates

The interest of the underwriter in this direction is not abating by any means. The Providence-Washington Fire Insurance Company has recently established an automobile department for the purpose of insuring automobiles and motor vehicles against fire, theft, collision and transportation hazards under what is termed in insurance parlance a general floater form. Indemnity for collision is covered under a rider, with an additional charge. The old established Hartford Fire Insurance Com-

pany has made arrangements to handle its automobile department through special agents separate from the fire department.

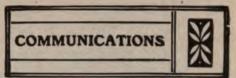
NO LIABILITY INSURANCE IN IOWA.

The man possessed of the speed craze is not to be encouraged in his madness. It is noted that the insurance department of the State of Iowa has just delivered itself of an utterance to that effect. The department's ruling is that liability insurance companies will not be allowed to issue policies protecting the owners of automobiles against suits resulting from injuries caused by their machines. The department holds that such form of insurance is contrary to public policy, in that it has a tendency to encourage careless driving and excessive speed, and that liability insurance may be taken in the future only to protect freight automobiles. The "automobile hazard" is not likely to decline in frequency. At the recent meeting of the International Association of Accident Underwriters, at Niagara Falls, it was stated that within the year 1,663 claims for damages for accidents were made on the companies by owners, passengers and chauffeurs, involving twenty-six deaths, and that one in every sixty-four accidents is fatal. There were 1,635 injuries involving 3,798 weeks of total disability and 4,307 weeks of partial disability.

Automobile insurance, whatever its form—fire, collision or casualty—is a pretty good form of investment. It is not exactly like that of life insurance, which so many people look upon as they would regard in vestments in houses or lands, or stocks and bonds, but it is one that will pay. Of course gains cannot be made by it as from the other forms of investment alluded to, but there are so many possibilities to be guarded against that it behooves every owner of an automobile to protect himself, just as he insures his house, or garage, or his life. And in saying this there is no axe to grind.

Automobile insurance is in its infancy, but it will attain sturdy growth. The insurance man may be depended upon for an intelligent campaign of education in this line, an education which shall force upon the attention of every automobile "risk" the knowledge that insurance is one of life's necessities to the automobilist. Insurance against disaster is a form of insurance which comes nearer to being one of the absolute necessities of the automobilist than any other. With so many strong insurance companies in the field it is safe to say that the automobiling public will not be long left in ignorance of the benefits of the forms of insurance they have to offer. Any policy indemnifying for disability or damage is a necessary, businesslike precaution, and the insurance companies now looking for business in the automobile field are such as command the confidence and support of their clients.

The stock capital of the Fiat Automobile Company, in Turin, Italy, has recently been increased from 9,000,000 to 12,000,000 lire.



# Manufacturer's Comments on Glidden Tour.

Editor Horseless Age:

Now that the Glidden Tour is over, and the manufacturers and contestants have had an opportunity to view the event from a commercial as well as a sporting standpoint, they cannot help but arrive at two conclusions:

First, that the tour was a great success in the development of the business in the section of the country through which it passed, and that it should be repeated; and, secondly, that for the coming season the rules covering the run should be more strictly and scientifically drawn than they were this year.

For instance, in this year's run cars made a perfect score and yet experienced considerable difficulty, as no penalizations were imposed for adjustment of carburetors, ignition troubles, oiling or adjustment of brakes, and cars were allowed to be towed; and fourteen of the entrants, including some six cylinder cars and prize winners, were towed. Had the rules this year taken these matters into consideration, the cars would have ranked quite differently at the end of the run.

We believe that ignition trouble is one of the most serious difficulties to the average automobilist, and one which is the cause of more stoppages than any other one thing. Undoubtedly, also, the oiling system is of the utmost importance to the entire life of a car, and any event of the nature of the Glidden Tour should put the oiling system to the severest test.

Dependable brakes of long service are what every motorist wants, and that a perfect score car could go through making frequent adjustments to the brakes without penalization we do not feel is just right. Without detracting from the splendid performance of the perfect score cars, we cannot help but wonder what the result would have been had the rules been drawn up in a more technical way and with less favoritism to the large cars.

Our own entries, which won Class D, cars selling from \$1,000 to \$1,750, were lost sight of in the placing of the final awards, and the public were made to feel that nothing but the high powered and expensive cars were capable of winning such an event, whereas our cars made the entire run without adjustment of carburetor, ignition or oiling system, and it was not necessary to even tighten the brakes, and we were not towed up any hills. The light weight of our cars reduced our tire trouble to a minimum, we having only two punctures, the same casings carrying the cars through the entire trip. It must be borne in mind that these cars carried the same number of passengers as the larger and more powerful

cars, so that the total cost per passenger was very much less than that of any of the larger and more expensive entrants.

We trust that next year you will use your influence to make the run even more strenuous than it was this year, a trip from the Atlantic to the Pacific, we believe, being the most advisable, and that the rules be gotten up in a way to give the lower priced cars the same chance as the high priced ones.

MAXWELL-BRISCOE MOTOR COMPANY.

# Cause of Difficult Starting. Editor Horseless Age:

I have a 36 horse power, four cylinder gasoline car and occasionally make the mistake of killing the engine by pulling it down, in which event it is a very hard job to start it again. Cranking with the spark off and then with the spark on doesn't seem to help. Ordinarily the engine starts very readily and after standing for a few hours nearly always goes with a half turn of the crank. What is the trouble and how may I avoid it?

CHARLES E. CRISMAN.

[Probably your carburetor is so adjusted as to give too rich a mixture under the conditions which stall your engine. Such a fault would not only tend to make the engine stall easily but would make it hard to restart, for the excess of gasoline present in the cylinders makes a mixture too rich to ignite. A few turns of the crank with throttle closed and relief cocks open should clear out the excess of gasoline and restore normal conditions, when the engine should start with its usual ease.

The proper adjustment to remedy this defect depends upon the type of carburetor. If it has an auxiliary air valve, the spring probably holds the valve to its seat with too great an initial pressure. If adjusting the spring to relieve this pressure gives too weak a mixture at high speeds a new spring may be necessary. If your carburetor is of the puddle type, slightly reduce the depth of the puddle by bending the float arm downward.—Ep.]

# Offsetting Cylinders.

Editor Horseless Age:

It would seem that Hugo C. Gibson in criticising the article on "Offsetting Cylinders" and the results obtained was misled by the fact that my article was cut down, and he assumed that the method used to get results was wrong. Mr. Gibson is not to blame for the fact that the article was not complete as published. He concludes that 80 degrees spark lead must mean that the charge was polluted. He is wrong in this, however. While the apparent spark lead is 80 degrees, the contact period is 8 inches on the same 13 inch circle, so that the actual lead as indicated by the centre of contact was only 43 degrees. As to the state of the charge, the power developed would indicate that it was O. K. As to the position of the spark lead ahead and from the true dead centre, it was accurate. The dead centre was located by trammeling the engine, using the lower edge of the piston and carburetor port as a gauge point, so that the true dead centre is a point where the piston pin, crank pin and crank shaft centres are in a straight line. The same is true on both top and bottom dead centres. It is sometimes held that the piston of an offset engine is in dead centre when the connecting rod is parallel to the centre line of the cylinder.

As to the effect on the port timing there is no gain by offsetting when viewed from the proper standpoint. Mr. Gibson ventures the opinion that no tests are of value unless the engine speed is, say, 1,500 r. p. m. He might as well reason that if an engine does not run at 1,500 r. p. m. it is not suitable for automobiles. The engine used in the tests was of the marine type, rated at 4 horse power at 900 r. p. m., and does good work at that speed, while at the speed suggested it would be useless to attempt to drive a launch with the propeller coupled up direct to the shaft. As to the claim that "offsetting decreases in value as a friction remover as the speed increases,' this is a new theory to me. If he can quote any authority who can prove it to the readers of THE Horseless Age and myself I think it would be interesting. A high speed engine test will perhaps prove the claim as to lack of balance. (See THE HORSELESS Age of October 28, 1908, page 578, where it is stated that the Daimler Company discarded the feature on that account.)

JAMES McIntosh.

# Motor Truck for Carrying Lumber. Editor Horseless Age:

Could you inform me through the columns of your paper if there is a motor truck on the market fitted with a body adapted to carrying lumber, i. e., planks and joists 20 to 30 feet long? Dumping cannot be done with an ordinary open body and much time is lost unloading piece by piece. I have failed to notice in the various advertisements and manufacturers' catalogues mention of a truck of about two tons capacity supplied with a quick unloading body, and would appreciate any information you could give me on the subject.

F. H. D.

[Truck manufacturers usually build the bodies to order to meet the user's requirements. We cannot recall at the moment any instances of the use of motor trucks for lumber hauling, except in the forests of Maine, and there, we believe, no special loading means are used. It would seem to be a relatively easy problem to construct a special body that would dump sideways, being strongly hinged on one side and provided with rails or guides which would cause the logs to fall clear of the wheels, the other side of the body being raised by means of a derrick or hoist operated by the vehicle motor. If any reader knows of a body suitable for logs that can be dumped in some such way we should like to hear from him.—ED.]

### Queries.

Editor Horseless Age:

As a reader of your journal I would like to see a report of the investigation, or, rather, experiments, made with different kinds of rubber tires in the sand near Detroit, Mich., a short time ago to determine the best tire for sand.

Will a four cylinder engine give better service than a two cylinder of the same horse power on very sandy roads when the pulling is heavy all the time? Will a double opposed, horizontal motor produce the same power as a vertical of the same horse power? How do steam and gasoline engines compare where roads are sandy and the pulling is heavy? Is an engine overloaded when it can propel the car, or is it better to have a surplus of power? Is it as liable to overheat with the surplus power? Which will give the best continued service? What would be the best ratio of gear, 3 to 1 or 4 to 1, where it is not a question of speed but good service? heavy pulling make engine smoke? Are you getting good service and mileage when the engine is smoking? J. DRACE

[The first of your questions cannot be answered directly, but the following answer may serve your purpose. If you have a four cylinder engine and a two cylinder engine, both giving substantially the same horse power at the same speeds of revolution, and if both were geared to the rear axle with the same ratio of gearing, then both should pull equally well in sand. The four cylinder would undoubtedly hold up to the work better at very low speeds. awing to the fact that the minimum speed of operation under load is usually less with four cylinder motors. This is all a matter of flywheel capacity, however. should be absolutely no difference between a two cylinder opposed and a two cylinder vertical motor, especially if the two cylinder vertical has only a single crank throw, so as to evenly space the explosion, the same as the opposed motor. The stem power system is more flexible and per of producing much more power for that periods than continuously. For this reason the system is particularly suitable where very steep hills are encountered occasionally, or deep sandy stretches. An engine is overloaded when it is pulled down in speed to such an extent that there is knocking in the bearings. It is hard on any engine to work it continuously near its maximum power, and it is better to have a somewhat larger engine on the car. The larger motor will not overheat so easily as the smaller one, provided the radiator capacity is in proportion to the horse power ratings. The larger engine will give the best continuous service, provided the car is not driven as fast as the larger engine will allow it, but is throttled down where the draft is light. If the roads in your vicinity are sandy it is much better to use a 4 to 1 than a 3 to 1 gear. You would, of course. not be able to go quite so fast on level roads with the 4 to I gear.—En.]

# NEW VEHICLES AND PARTS ➤ ➤

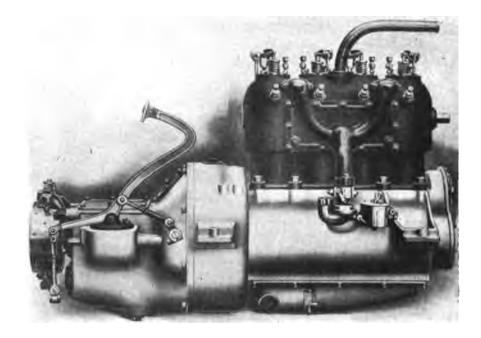


# Chalmers-Detroit 1910 Models.

There will be two chassis models of Chalmers cars for 1910. Both will be practically continuations of last year's models, but will be considerably larger cars. In mechanical construction they are almost identical with the cars announced a year ago, but exhibit that refinement of detail which comes with additional experience. These two chassis will be fitted with a variety of bodies sufficient to suit all tastes.

THE "THIRTY."

The motor of the new "Thirty" is 4x41/2 inches, which is one-eighth inch larger bore than the 1909 model. All the typical constructional features of last year's motor have been retained. The large diameter crank shaft mounted on two annular ball bearings, the barrel crank case of aluminum, the four cylinders cast together, block fashion, with inlet valves overhead and exhaust valves at the side, are the same as on the 1909 model in their general design. The inlet valves have a clear diameter equal to one-half that of the cylinder bore, and the exhaust valves have been considerably enlarged, being now 17% inches in clear diameter. The exhaust manifold increases rapidly in size from the forward cylinder to its junction with the pipe to the muffler, which is remarkably large, forming the best combination the writer has yet observed for clearing the cylinders.



INTAKE SIDE OF "THIRTY" UNIT POWER PLANT.

The inlet manifold is still cast with the plate, which covers one side of the water jacket for the cylinders, thus heating the entering charge enough to thoroughly gasify the fuel.

As in the 1909 car, lubrication is by splash from an oil pool whose level is maintained by a pump which circulates oil from a tank below the crank case through a large sight feed on the dash. Instead of the gear pump formerly used for circulating the oil, a plunger pump is employed on

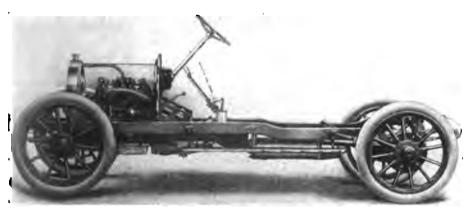
this model. Its barrel is placed in a horizontal position and the plunger is operated from the rear cam. This makes all parts of the pump extremely accessible.

The water is circulated by a centrifugal pump. The fan has been improved by the addition of a rim connecting the ends of the blades. A new type of carburetor is employed, with ball valves for the auxiliary air. The ignition wiring is noticeable for its neatness. All the terminals are brought through the dash from the back of the coil in porcelain insulators.

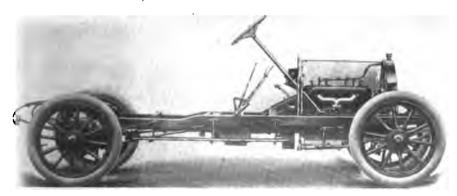
The multiple disc clutch is retained exactly as in 1909. The change gear case is still bolted to the rear of the crank case, so as to enclose the flywheel and clutch. This gear gives three speeds and a reverse selectively. The gears are of carefully heat treated chrome-vanadium steel. The shafts are short and are mounted on annular ball bearings. The final drive is through a single universal joint. This joint is enclosed in a metal case and is steel bushed throughout. A torsion tube surrounds the propeller shaft, but the car is driven by the forward part of the rear springs.

The rear axle is of the full floating type with annular ball bearings throughout. A four pinion bevel differential is used. The front wheels are also mounted on annular ball bearings. The front springs are semi-elliptic and the rear are three-quarter elliptic. The springs have been slightly improved from last year. Grease cups are fitted on all working parts. The rear links have both sides forged together with a connecting band which keeps the links from turning wrong end up when going over unusually rough roads.

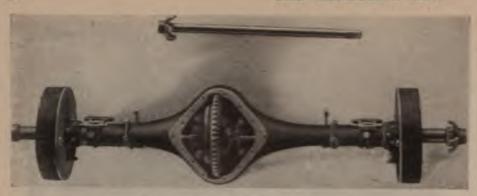
Expanding brakes act on the rear wheel drums and a contracting brake is placed at the rear of the change gear. This location brings it up out of the dust and mud,



EXHAUST SIDE OF CHALMERS-DETROIT "THIRTY" CHASSIS.



CONTROL SIDE OF CHALMERS-DETROIT "FORTY" CHASSIS.



REAR AXIE

and equalizes the action through the differential. The operating rods for the wheel brakes are carried inside the frame.

Steering is by the same worm and sector gear used the past year. The gear shifting mechanism has been slightly improved, and the levers are inclosed in a tight case. The single pedal for clutch and transmission brake and the side swinging accelerator are retained.

The frame is dropped just in front of the rear axle, and rises again at the rear of the front seat. This allows of placing the doors and the tonneau floor lower, and so lowers the centre of gravity of the car. The upper and lower flanges of the frame are tapered, being much wider near the middle than at the ends. This gives considerably greater stiffness, even with the increased wheel base.

The hood has been raised and lengthened to conform with the increased size of the car. The wheel base is 5 inches longer than last year, being now 115 inches. The regular tread will be standard, but 60 inch tread will be optional. The wheels are 2 inches larger in diameter than last year, being 34 inches, and fitted with 33/2 inch tires.

### THE "FORTY."

The principal changes in the "Forty" are those made advisable by the lengthening of the wheel base, and the enlargement of the touring body to give room for seven passengers. The motor is still 5x43/4 inches, with valves all on one side. The three bearing crank shaft and pump circulation of oil have been retained.

No important change has been made in the leather faced cone clutch, but a double reduction of levers is used in the operating mechanism so that only about one-third the foot pressure formerly required is needed to disengage it. The position of the change gear shafts has been reversed, so that the lay shaft is now at the bottom. In the new car the gear shafts run in annular ball bearings.

Two universal joints are used in the propeller shaft. The torque tube on this year's car is made from two tubular members forming a triangular construction with a ball joint at the forward end, cushioned on helical springs. The rear axle casing is of pressed steel, autogenously welded in the neutral plane. The axle is of the floating type with bevel differential. Timken rings are used throughout.

The frame construction is similar to that on the "Thirty." The radiator has been changed from the tubular to the cellular type. The wheel base has been increased from 112 to 122 inches, while the wheels are 2 inches larger in diameter, being now 36 inches. The accelerator lever on the



STEERING CONNECTIONS.

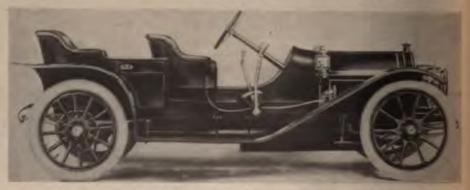
new "Forty" is of the swinging type, similar to that used on the "Thirty."

# BODIES AND EQUIPMENT.

The "Thirty" is furnished with touring, pony tonneau, roadster, inside drive coupé, limousine and landaulet bodies. In the touring body for the "Forty" two additional seats are furnished at a slight extra charge. Pony tonneau and roadster bodies are also furnished. Special arrangements have been made for purchasing extra equipment in quantities, and supplying the same to customers at low prices.

The Acme Roadster.
The Motor Buggy Manufacturing Company, of Columbia Heights, Minneapolis. Minn,, are building a four passenger car of the high wheeled type, for which they have chosen the trade name "Acme." The car is equipped with a double cylinder opposed motor of 51% inch bore by 41/2 inch stroke, and is rated at 22 horse power. A float feed automatic carburetor is provided and the ignition is by jump spark with double coils and dry cells and a storage battery. The motor is water cooled, the water being circulated through a brass tube, flanged radiator. The change speed gear is of the planetary type, enclosed in an oil proof casing, and gives two forward speeds and one reverse. It drives a countershaft from which the power is transmitted to the rear wheels by side chains, Diamond roller chains being used. The differential gear on the countershaft is of the spur type.

The frame is built up of 2 inch by 1/4 inch angle steel and supported by 40 inch semielliptic springs in front and 38 inch full elliptic springs in the rear. Both front and rear axles are solid forgings of 114 inch square section. The car has a wheel base of 97 inches and standard tread. Artillers type wheels are used, the front ones being 36 inches in diameter and the rear ones 41 inches, and solid rubber tires of from 11/2 inches to 2 inches width can be fitted. All of the road wheels run on roller hearings and the same type of bearings are used in the countershaft. The reverse gear of the transmission may be used for braking purposes, and in addition a pair of internal hub brakes are fitted. Both sets of brakes are pedal-operated. Steering is accomplished by means of a hand wheel, which is located on the left hand side of the car, through a worm and sector mechanism. The car weighs 1,500 pounds and a gasoline capacity of 12 gallons is provided. The speed is said to range between 1 and 25 miles per hour. The car has a road clearance of 17 inches. By removing the rear seat a delivery box can be fitted in which loads of 500 pounds or more may be carried.

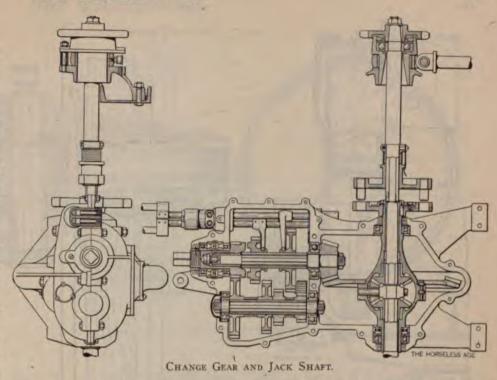


CHALMERS-DETROIT "THIRTY" PONY TONNEAU.

# Alco Three Ton Truck.

The American Locomotive Company, Providence, R. I., have placed upon the market a three ton truck which is the culmination of a series of experiments during which five different models were built. The elimination of the weak and undesirable elements in these models is said to have resulted in a thoroughly reliable design. Its general features, as disclosed by the half-tone cut, are those common to a number of trucks now on the market, but automobile engineering is now a matter of carefully worked out details, and in this respect the Alco truck will repay investigation.

The motor, situated under the driver's seat and footboard, is not only accessible by removing the footboard and opening the side doors, but may be removed from the chassis by sliding it forward after removing the radiator and front cross member of the frame and disconnecting various pipes and control members, all of which, it is claimed, can be accomplished by two men in less than half an hour. The motor has four cylinders of 3 15-16 inch bore and 434 inch stroke, cast in pairs, and its speed is limited by a governor to 1,000 revolutions per minute, at which speed it develops 24 horse power. The crank shaft is made of a special alloy steel, suitably heat treated, the experience of the American Locomotive Company having demonstrated that the best of material is necessary in the working parts of a motor used in commercial vehicles. Hand holes are provided in the upper half of the crank case through which the crank shaft bearings may be inspected; to make adjustments, however, it is necessary to remove the lower half of the case. The cam shafts are made from special steel, with the cams integral, hardened and ground to a master cam. The valve plungers



and rollers are also hardened and ground, and the valve heads are made of high nickel steel. The hollow wrist pins are hardened and ground and are secured in the piston by the threaded taper pins shown in the cut. No means of locking this pin is provided, but it is said never to come loose, an indication of conscientious work-manship.

Lubricating oil is drawn by a gear pump from a reservoir cast integral with the lower part of the crank case cover and delivered to the main crank shaft bearings, from which the crank pins are oiled through holes drilled in the shaft. The excess oil flying from the connecting rods supplies the cylinders and cam shaft bearings. A Bosch high tension magneto with fixed advance is the source of ignition current.

A multiple disc clutch is housed in the flywheel, the discs, alternate ones of which are of steel and bronze, being lubricated by an oil bath.

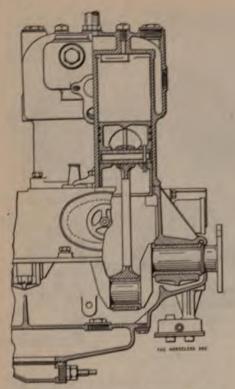
A three-speed and reverse selective gear is used, supported on three points, with Hess-Bright bearings and 3½ per cent. nickel steel gears case hardened and drawn to reduce brittleness.

Both service and emergency brakes are situated side by side in wide drums, forged integrally with the large sprocket and are faced with Raybestos. No attempt is made to protect the brakes from mud and dust.

Timken bearings are used it all wheels.



AMERICAN LOCOMOTIVE THREE TON TRUCK.



SECTIONAL VIEW SHOWING ENGINE DETAILS.

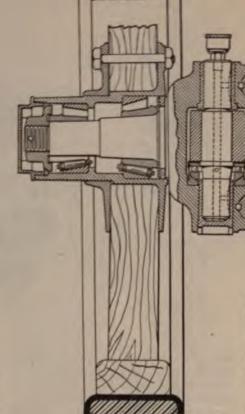
The front wheels are equipped with 36x5 inch solid tires and 36x31/2 inch dual tires.

The chassis weighs 4,500 pounds and with the motor running at 800 r. p. m. the car runs at the following speeds: High gear, 9 miles per hour; intermediate, 6 miles per hour; slow, 3 miles per hour; reverse, 21/2 miles per hour.

The metric system is used on all shop drawings for automobiles by the American Locomotive Company, except where the English system is necessary to accommodate the use of standard parts.

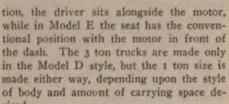
# Wilcox Motor Trucks.

The H. E. Wilcox Motor Car Company, Minneapolis, Minn., are building a line of commercial vehicles in 1 ton and 3 ton sizes, and in two models, characterized by the position of the driver relatively to the motor. In Model D, shown in the illustra-



sired.

The four cylinder motor for both the 1 ton and 3 ton cars is of 41/4 inch bore by 41/2 inch stroke, with cylinders cast in pairs and valves on one side. The cylinders are offset from the vertical centre line of the crank shaft and are cast from air furnace iron, as are the pistons. Oiling is by splash, the proper oil level in the crank case being maintained by a pump drawing from a





WILCOX THREE TON TRUCK, MODEL D.

chamber cast in the lower part of the case. the excess oil returning through an overflow. The system, as worked out in its details, insures an even distribution of oil regardless of the inclination due to grades. The regular ignition equipment consists of a Bosch high tension magneto, with storage battery and coil,

FRONT AXLE END OF ALCO TRUCK.

THE RUSSILESS ASE

The same three speed gear box is used on all models, with twenty-one and fortyeight tooth bevel gears and twelve and forty-five tooth sprockets on the 3 ton, and twenty-three and forty-eight tooth bevels with fourteen and forty-five tooth sprockets on the I ton truck. With these gear ratios the 3 ton truck will run 15 miles per hour, and while only 18 miles per hour is claimed for the I ton, it is said to be capable of dong 23.

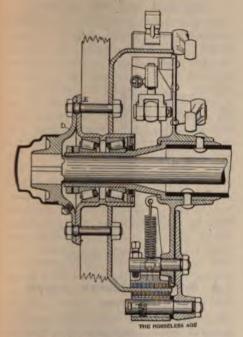
The 3 ton truck with open stake body weighs 5,600 pounds. The 1 ton Model D. with open stake body, weighs 4,300 pounds, and the I ton Model E, with the same body, 4,200 pounds. These trucks are assembled from standard parts.

# Timken 1910 Rear Axles.

The Timken-Detroit Axle Company are manufacturing two sizes of rear axles for the coming season. The smaller axle is for cars up to 35 horse power and about 2,400 pounds in weight, while the larger axie is recommended for machines up to 60 horse power and weighing 3,200 pounds. The two axles are nearly alike, except for size, and will be described together.

Following advanced practice the housing for the axle shafts and gears is in one piece of pressed steel, of the shape shown by the illustrations. It is formed from upper and lower halves of three-sixteenth inch stock, which extend from wheel to wheel, autogeneously welded together on the horizontal plane. This brings the weld practically in the neutral plane, and the completed housing forms a truss whose strength is far in excess of that required. External truss rods are done away with.

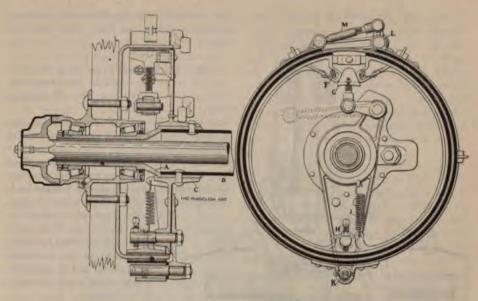
The section of the central assembly shows



END ASSEMBLY OF SMALL AXLE.

the driving mechanism of the larger axle, but that of the smaller is practically the same. It will be seen that driving gears are carried in a cast unit, so that all the driving strains are taken by this casting. This unit is assembled on the bench, the bevels being accurately meshed, and is then slipped in place through the large hole in the front of the pressed steel housing. It is fastened in correct position by numerous bolts.

The large opening at the rear of the housing is closed by a thin pressed steel cover held by cap screws secured by lock washers. This opening makes the parts very accessible. The axle shafts have square ends which fit into the differential gears. They may be withdrawn through the outer ends of the axle tube. When they are drawn out far enough to clear the differential bearings the driving bevel and differential may be removed from the rear by taking off the



END ASSEMBLY OF LARGE AXLE.

caps to the seats for the differential bearings. The pinion and shaft may then be removed through the rear opening.

The short Timken bearings are used throughout. Those to the differential are adjustable by collar nuts. The mesh of the gears may be varied by this adjustment and by the nut which contains the cup of the bearing at the rear of the pinion. This latter is adjusted and locked through an opening just above it. The pinion shaft bearings are large and are placed a good distance

The sectional assembly of the end of the large axle shows a typical floating construction with the usual form of clutch hub. All parts are securely locked and working parts are protected from the dust. The sleeve A, which carries the wheel bearings, is machined from a forging, giving uniform metal, which is almost impossible to obtain when this reduced diameter is machined from the stamping. It is forced

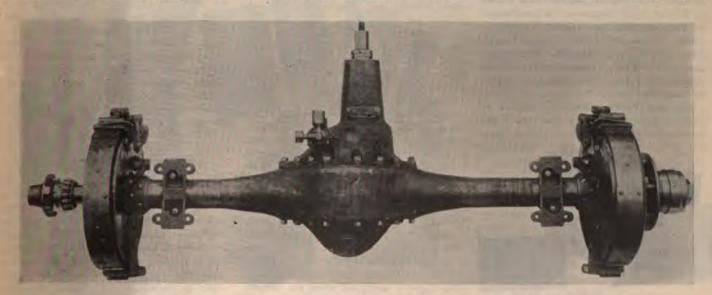
tightly on the end of the main housing B. Brake support C is placed over the two, and all three are fastened securely together by large rivets.

The end of the small axle is similar to that just described, except the method of driving the wheel. This is accomplished by forging D, which drives from the squared end of the axle shaft to bolts E.

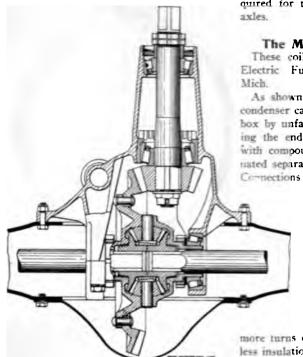
This size of axle is also made in a fixed hub or "non-floating" type.

The brakes for both axles are identical, except in size. Those for the small axle have an internal contact surface of 2x12 inches. For the large axle these dimensions are 2½x13½ inches. Both brakes are faced with asbestos copper fabric, and make contact their entire length.

The internal brake consists of a cast shoe expanded by wedge G. It is held central in the off position by springs F and J, which pull the shoe against two stops at the open ends and against adjustable stop I.



NATIONAL 1910 PRESSED STEEL REAR AXLE MADE BY TIMKEN-DETROIT AXLE COMPANY.



CENTRAL ASSEMBLY OF TIMKEN 1910 AXLE.

These stops also hold the brake in the proper position sidewise, and, together with the springs, prevent rattling. Anchor H prevents the brake from turning.

The external brake is a simple spring steel band. The operating bell crank is pivoted in the end L and pulls adjustable link M to contract the band. This is about the simplest mechanism suitable for this purpose. The brake is held firmly in its off position by the spring of the band, and by the helical spring K located in a recess in the anchor pin. These force it tightly against stops, which hold it firmly, both radially and sidewise.

Spring seats are split and the ports held together with two bolts. This allows the axle to be readily detached from the springs. The torsion member is of the V or Renault type, hinged to the gear housing so as to swing horizontally.

Alloy steels are used in all important parts of these axles. Their quality is maintained uniform by an extensive physical and chemical laboratory whose tests insure careful heat treatment.

The new Timken factory at Detroit is equipped with the latest apparatus for forg-

ing, machining and assembling the parts required for these and their other types of axles.

# The Michigan Type A Coils.

These coils are made by the American Electric Fuse Company, of Muskegon, Mich.

As shown by the cut the secondary and condenser can be readily removed from the box by unfastening two clasps and removing the end piece. The box is not filled with compound, but the parts are impregnated separately before they are assembled.

metal plugs, which fit tightly in suitable metal sockets. This construction permits the parts to be inspected and tested, and if any part breaks down it can be readily replaced.

The coils are wound with American black enamelled wire. The secondary is wound in sections, allowing

more turns of wire in a given space, since less insulation is needed, owing to there being less difference of potential between adjacent wires. Danger of breakdown is also greatly reduced.

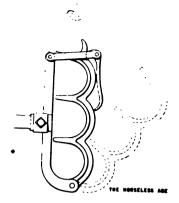
The American Company are also making a coil in a moisture-proof metal case. This is designed to bolt directly to the motor, which placing greatly simplifies the wiring.

The American Company are one of the only two makers of spark coils in this country who produce every part of their coils.

# The Bair Auto Top Holder.

The Auto Specialties Manufacturing Company, of 375 Golden Gate avenue, San Francisco, Cal., are marketing the Bair auto top holder, a device designed to keep the bows of an automobile top from rattling when the top is down. The holder consists of two bars hinged together, one of the bars being substantially straight and the other formed with semi-circular slots to fit the individual bows. The device is made to fit three, four or five bow tops. The free end of the straight bar is provided with a pair of shackles and a quick-operating spring clamp for rapidly placing and removing the holder.

None of the old style socket devices at present in use separate the weight of the bows, so that whenever there is jarring or jolting from crossing ruts or obstructions all the weight of the top comes down with a bang on the bottom bow. Straps always have the tendency to stretch in dry weather, permitting the bows to flap and jar, or to shrink in damp weather, so that frequently when the top must be raised in a hurry it becomes necessary to cut the straps. Where socket separators are used, the strap is also necessary to keep the bows together. and all the inconvenience incidental to a strap alone is increased when the strap is used as an adjunct to the socket separators.



BAIR AUTO TOP HOLDER.

# A British Automatic Speed Governor.

Vice Consul H. M. Byington, of Bristol, reports as follows concerning a new British apparatus which controls the speed of motor

According to the published description of a practical trial, the device automatically removes the clutch when the speed of the car slightly exceeds the arranged limit, and when necessary the brake is also automatically applied until the rate is reduced just below the limit. The brake is then quickly but gently removed and the clutch again put in. A semaphore is automatically raised to warn the driver when he is approaching the maximum. The mechanism, which fits in a compact aluminum box and works in oil, takes very little space. It is put in action or out of gear in an instant. and there is no need to stop or slow down the car while this is being done. The apparatus can be locked up so that the driver of a car cannot exceed the speed desired by the owner

Every effort was made on the trial to get the car to exceed the limit, which was set for 16 miles an hour. On coming to a fairly steep hill the engine was allowed ful power and the car instantly started to gain speed. But as soon as the limit was reached the brakes were applied strenuously, as if by magic (though no sudden jar was experienced), and the engine merely "raced" without the slightest effect on the car, the speed being maintained at the 16 mile rate throughout.

# Special Physician's Car.

The Buckeye Manufacturing Company, of Anderson, Ind., is preparing to build a car especially adapted to the use of physicians, it is reported. The design will be from ideas suggested by Dr. N. S. Wood, an Anderson physician. It will include the salient features of a runabout and ambulance, and will be designed for emergency work by physicians. A folding stretcher will be one of the special features.

# Franklin Die Cast Bearings.

The H. H. Franklin Manufacturing Company, of Syracuse, N. Y., who have been making die castings for the past fifteen years, have recently concentrated their attention on die cast hard babbitt bushings for gasoline and other engines. Perhaps one of the reasons for this recent move is that automobile motors, for instance, are now made by many manufacturers in such large numbers that the pro rata cost of the dies has become quite small, and in the case of the largest manufacturers the die cast bushing would be materially cheaper than a phosphor bronze bushing. It is, however, not so much the saving in cost as the superior bearing qualities of their hard babbitt composition that the Franklin Company lay the greatest stress upon. A bearing metal must have a low frictional coefficient, so as to minimize the loss of power in the bearings and their consequent heating, and it must also have sufficient rigidity to stand up under the pressure imposed upon it and not peel up, squeeze out, sliver or crush. The need for rigidity is especially imperative in the case of gasoline engine bearings, as not only is the unit pressure high but the pressure varies continuously between the maximum and zero. This condition at once eliminates the softer babbitts, which would not stand up in the work. There remains the choice between phosphor bronze bushes and hard babbitt die cast bushes. The Franklin Company claim that the hard babbitt bushing is superior in every respect. Its most valuable quality is the plasticity of the babbitt, which prevents cutting of the shaft in case the bearing should become heated owing to the accidental absence of oil. The rigidity of the bushings made by the Franklin Company's process is increased somewhat by the pressure to which the metal is subjected in pouring. These bushings have been used on one well known make of cars for the past six years, about 7,000 cars having been fitted with them, and are said to have given universal satisfaction.

In connection with the theory of bearing metals, it is held that in order to maintain a low degree of temperature under pressure and thrust the metal must have a plastic matrix for its body, combined with a network of small, compact crystals to carry the load and stiffen the casting. Zinc is still used by some for making this granular structure, but zinc offers no advantages, except in price, over the antimony and copper alloys, with tin forming the plastic body. All zinc-copper alloys are devoid of the plastic element. The same is true of nickel and aluminum. Such allovs used as a bearing are said to fail at high speed, their use being confined to large bearings under great pressure running at an even speed

The die casting process lends itself to the production of both split bushings for the crank pins and crank shaft main bearings, and for the cylindrical bushings for cam shafts and other auxiliary shafts of the engine and car. The split bushings are generally cast with their oil grooves and plugs for keeping them from turning in their boxes. In the "full" bushings it is necessary to cut the grooves afterward, however. The bushings are completely finished when cast, except for a slight trimming at the edges. Not the least advantage of these die cast bushings is their absolute interchangeability. The writer was told that if 500 bushings are made from the same dies the cost is about equal to that of phosphor bronze bushings; also that the die casting process is limited to bushings of less than 6 or 7 inches in diameter, which, of course, includes a large range of work.



FRANKLIN DIE CAST BEARING BUSHINGS.

# The Chicago Meeting of the S. A. E.

The midsummer meeting of the Society of Automobile Engineers was held in Chicago August 5 to 7, inclusive. Through the courtesy of F. J. Newman, chairman of the special committee of the meeting, the society was enabled to make the Illinois Club its headquarters during the meeting, and the privileges of the club were extended to all visiting members for a period of two weeks.

The first day of the meeting was given up to visiting the Algonquin Hill climb, machines for conveying the members to and from the town of Algonquin, a distance of 60 odd miles from Chicago, being furnished by the courtesy of various Chicago dealers.

On Friday the society assembled in the spacious banquet hall of the club to transact business and to listen to the reading of the papers presented. After business had been disposed of Professor Carpenter read a paper on the "Commercial Test of a Six Cylinder Pierce Water Cooled Motor." This paper was written as thesis work by J. A. Luhrman and G. W. Woodward under Professor Carpenter's supervision. Professor Carpenter did not confine himself to the published paper, but spoke on various practical points brought out in the tests, among which were some points on the use of the manograph. He also spoke of the use of a specially devised arc lamp and of various instrumental errors of the instrument and their causes. One point about the motor upon which he laid special stress was the high thermal efficiency of 20 per cent., which was as high as had ever been attained with anv internal combustion engine using gasoline as fuel.

Other papers read were by Dr. Sohal on "The Possible Increase in the Weight Efficiencies of Storage Batteries," and "Some Points in the Care and Operation of Vehicle Batteries," by H. H. Beck. The discussion of these papers was postponed until the Saturday session. During the afternoon about twenty of the members visited the Pullman works on a tour of inspection.

The final session was held on Saturday, August 7, at the South Side Country Club. the members being conveyed there in autos loaned by the Chicago dealers. The papers read at the previous meeting were first opened for discussion. The discussion on the two battery papers was quite interesting. Some facts were given by Mr. Churchward on weight efficiency of the later forms of Edison battery. The discussion of the Beck paper turned mostly on the comparative values of the hydrometer, voltmeter and ampere-hour meter as an aid to keeping batteries in condition and estimating the amount of charge still remaining in them. Then followed the reading of the papers "Energy Consumption of Commercial Vehicles," by Alexander Churchward; "Notes on Lubricating Oils," by F. H. Floyd, and "The Electric Cradle Dynamometer," by H. S. Baldwin.

The discussion of Mr. Churchward's pa-

per (which paper is reprinted elsewhere in this issue) brought out many interesting facts regarding the effect of tires of various kinds and conditions on the mileage, such as the degree of inflation of pneumatics and the composition of solid rubber tires. This discussion was largely among those members connected with firms having to do with electrics, and it would seem that much more thought had been given to these minor matters by them than by the makers of gasoline cars. As Mr. Baldwin was not present, there was no discussion of his paper, although Professor Carpenter made some remarks on dynamometers in general.

Two papers were laid over until the next meeting. At the close of the meeting the members and guests were invited to a lunch as the guests of the Woods Motor Vehicle Company. After the lunch quite a number of the members availed themselves of the club privileges. The attendance at both sessions was about forty, and was remarkble for the large number of members coming from a distance, probably more than half living at least 500 miles from Chicago.

# Manufacturers' Contest Association to Discuss Rules.

The general rules committee of the Manufacturers' Contest Association will hold a meeting at Indianapolis, Ind., August 19-21, during the initial races on the new Indianapolis Motor Speedway. Among the most important subjects to be discussed are the following:

- 1. Recommendations as to changes in the classifications and weights for 1910 season.
- 2. Changes to be recommended to the contest board for the American Automobile Association rules of 1010.
- 3. The possibility of the support by the Manufacturers' Contest Association of an impartial and thoroughly capable technical committee, which shall serve at all competitive contests.
- 4. The arrangement of a definite and logical schedule of all important contests for the season 1910, with a view to the announcement in September of this year of the approximate dates, character and general conditions governing all such events. (From information at hand it is a certainty that the promoters of all annual events will for 1910 be very glad to co-operate, as may be suggested by the M. C. A., in so scheduling these contests as to avoid interference of dates. The interests of the promoter and of the manufacturer who is asked to support the contest with entries are mutual.)
- 5. National events. How many shall be supported and of what character?
- 6. International events. How many shall be supported and of what character?
- 7. Endurance contests. Action to be taken upon the recommendation made by the National Association of Automobile Manufacturers, that only one endurance contest be scheduled for any one section of the country, and not more than four be supported by manufacturers' entries.
- 8. Road racing versus track events upon specially constructed speedways of any less than two miles in circummerence.
- 9. Shall racing upon existing mile and half mile horse tracks be countenanced or supported in any way?
- 10. A standard electrical timing device for the elimination of human error in the timing of all important speed events.
- 11. A satisfactory definition of the term "stock car."
  - Steps to insure the enforcement of the rule ag the character of the publicity matter

employed by any maker covering the performance of his cars in any contests. All such publicity must be in accordance with the facts.

13. A formula for the proper comparison of the performances of steam and gasoline automobile motors

# Registrations by Makes in Minnesota.

According to recent statistics regarding the makes of cars registered in the State of Minnesota during the past year the Ford leads with 157, and others follow in the following order: Buick, 131; Cadillac, 105; Oldsmobile, 77; Maxwell, 64; Packard. 61; Overland, 55; Stoddard-Dayton, 50; Stevens-Duryea, 49; Mitchell, 45; Wilcox, 45; White, 41; Franklin, 41; Kissel, 36; Peerless, 29; Autocar, 27; Rambler, 27; Columbus, 22; Elmore, 21; Reo, 21; Aerocar, 20; Queen, 20, etc. That twenty Queen cars were registered shows that a great many of the registrations are of second hand cars, as this make has been off the market for over a year.

# Settlement Proposed in Royal-Duerr Dispute.

The Royal Tourist Car Company, of Cleveland, Ohio, and the receiver for its former New York agent (C. A. Duerr & Co.) have been in controversy for some time, the receiver making a claim of \$9,800, which sum was deposited by Duerr & Co. with the Royal Tourist Car Company, and the latter company make a counter claim for \$9,800 for damages and merchandise delivered. The Royal Tourist Car Company now offer to settle the matter by a payment of \$1,500, and a hearing on this proposal will be given at 2 Rector street, New York city, on August 19, at 11 o'clock a. m.

# New Auto Cylinder Plant.

The Frontier Iron Works, of Buffalo, N. Y., recently started a new iron foundry on Grant street, which will give employment to about 200 men. The company will eventually have six fireproof, reinforced concrete and brick buildings, and devote its chief attention to automobile cylinders. The officers of the company are Walter F. Semon, president; J. W. Semon, vice president, and James W. Murphy, secretary. The old plant of the company is located at the foot of Auburn avenue.

# Automobiles on Milwaukee Assessment Lists.

The tax commissioner of Milwaukee, Wis., announces that there are 1,081 motor cars on the tax rolls of the city, as against 491 in 1908. The value is \$634,860, against \$250,350 in 1908. As is natural, these figures do not show the real number nor the real value of cars in Milwaukee. It is interesting to note that the number of horse drawn vehicles of all kinds has decreased more than 10 per cent. The number of horses has decreased proportionately.

# To Manufacture Cars in Atlanta.

The White Star Automobile Company has taken up the manufacture of automobiles in Atlanta, Ga. The company at first built ' a high wheel machine, but discarded this design in favor of a touring car of modern appearance. It was incorporated with a capital stock of \$150,000, and is at present occupying part of the plant of the Atlanta Buggy Company on Means street. The first touring car was completed about two weeks ago. The 1910 models of the company will be exhibited at the Atlanta automobile show next November, and it is stated that they will also be entered in the endurance contests which are to be held in connection with the show. The car is a five passenger touring car of 35-40 horse power, and is obviously of the assembled type. It has a four cylinder, water cooled motor, with 41/2x5 inch cylinders, a selective type change gear and a shaft drive. Cars will range in price from \$1,250 to \$1,500, according to finish. Clarence Houston is president of the company and Larry Fell superintendent.

# General Motors Company Secures Option on Rapid Motor Vehicle Stock.

Following the recent announcement that W. C. Durant, of the General Motors Company, had purchased \$200,000 of the stock of the Rapid Motor Vehicle Company, there comes an apparently well authenticated report from Pontiac that General Motors representatives have obtained options on nearly all the remaining stock. There appears to be little doubt but what the options will be taken up at once. The present company recently started an addition, 100x640 feet, and three stories in height. It is reported that the General Motors, if they obtain control, will start a second addition, 100x300 feet, two stories in height, and also will erect a new building for woodworking and a new power plant.

# Alleged Ditching of Cars by Farmers.

Mayor Arnett, of Kokomo, Ind., is investigating a charge that Chief of Police A. M. Jackson, of that city, advised farmers to ditch automobiles that violate the speed laws. Several cars in the vicinity of Kokomo have been ditched recently by rails placed in the roads. Among those who have met with such obstructions are Edgar Apperson and Herbert Lytle.

# Garage Fire.

The garage of H. C. Bradley, of Fort Collins, Col., was destroyed by fire on July 30, causing a loss of about \$10,000. The fire is said to have been caused by a boy filling the gasoline tank of a car, spilling some of the gasoline onto a hot engine, thus igniting it. The boy was seriously burned about the face and head. Several touring cars stored in the garage were either destroyed or damaged.

# Commercial Applications.



# A Central Ohio Motor Passenger Service.

By E. Z. HAYS.

About the 1st of last March a joint stock company was organized at Warsaw, Ohio, under the name of "The Valley Auto Company," for the transportation of passengers and small packages. The chief object was and is the carrying of passengers up and down the Walhonding Valley, from Walhonding, through Nellie and Warsaw, to Coshocton, the county seat, a distance of about 20 miles. However, on putting our car in service, about the 1st of May, we found the demand for service so great that it was necessary to cut off a part of the proposed route, so that Walhonding, the proposed starting point, with about 7 miles of road is left out, and probably will be until we put on a second car, as we contemplate doing, should the present venture prove reasonably profitable.

We have been making two round trips per day, when we could run, but the unusually wet weather last spring was very much against us, especially in May and June. One of the road supervisors on our line, apparently to gratify a personal grievance against members of our company, does not work the road where needed, and, besides, there is still considerable ill feeling on the part of some citizens toward automobiles in general, mainly because their horses scare at them. Horses do not, as a rule, seem to like any size or kind of self propelled machine, but they are gradually growing accustomed to them, and the time is not far distant when they will not mind them at all. The fact is the automobile is here to stay, both as a private and a public conveyance, and the horse owners must put up with it. We have one citizen, a man who has been in the Legislature and held other important offices of trust, who swore autos should not be permitted to run on any road of less than 60 feet width. The auto people will have to bear with such overconservative characters until the public passenger automobile shall have demonstrated its practicability and its great convenience, and shall have become popular and virtually indispensable, as it will in the near future. Then the man who sings from policy will sing its praise.

### ROAD CONDITIONS.

But in this State the era of the automobile is not come, save in some limited sections where the people have improved their public highways. Our State laws are not stringent enough, not broad enough.

The road over which we run is built on Adam's plan and not McAdam's, except in patches where the river gravel has been utilized. While this is one of the most important roads in the county (Coshocton), it has been badly neglected, and much of the

work that has been done on it has not been applied in an intelligent manner. Nature has furnished an abundance of first class material for making a good road at a minimum of cost, but that material, which in no place along the line lies more than a quarter of a mile away, has been used but sparingly. The road grader, an excellent machine for road making, when judiciously employed, is the chief reliance of supervisors, as our road masters are called, and they depend on it to the exclusion, almost, of all other means. They hitch four to six horses to one of those machines, mount three or four men upon it and proceed to spoil miles on miles of good roads; requiring no work, by grading up from both sides, windrowing the sods and stones into the centre, where they remain to impede the passage of all kinds of vehicles, automobiles in particular.

We believe we will cover the 13½ miles of our route in an hour when the roads become settled and worn smooth, but one and a half hour per trip is about as good as we can do. Our route leads through a beautiful and interesting section along the Walhonding River, a very pretty stream, and is level, except for a couple of bad banks, needlessly taken in by the locators, probably for the sake of diversity.

#### CHARGES FOR EVERY SERVICE.

Our car has a capacity of sixteen passengers, though the public sometimes force us to carry twenty to twenty-four. The reader can imagine how snugly these must be packed-something like sardines in a box. Freight can be carried only in a boxlike rack hung onto the end of the car, and this necessarily limits the size and weight of packages. In this regard we find that much is expected of us in the way of unremunerative accommodations. "Well, you are coming up anyway, you run the car just the same, and you can do this for me, just as a personal favor," is an idea very prevalent. Our chauffeurs could find considerable employment in such odd jobs as exchanging shoes and corsets, in paying taxes and grocers' bills and in conveying verbal messages of the "I've not time before you start" kind. We have found it advisable to establish rates for all such chores. We have no charge less than 10 cents, which is for a package weighing not to exceed 6 pounds; 15 cents for 6 pounds, and all over 6 pounds I cent per pound, with some discretion left with the chauffeur as to bulky packages. Our passenger fare is about 3 cents per mile, but as we do not divide a five cent piece it runs sometimes over, sometimes under, this figure. The line is divided into 5 cent sections.

# PARALLELS RAILROAD.

We parallel the T., W. V. & O. Railroad from start to finish, but that road can hardly be said to be a competitor. Its passenger service is so unsatisfactory that we did not count the railroad as a factor against us when contemplating the organization of our company. From this point to Coshocton, the county seat, our fare is 30

cents; that of the railway is 20 cents, yet we have been carrying, when able to run at all, practically all the local pasengers, unless, owing to some attraction in the city, the requirements for accommodation exceed our capacity.

We take the same route back and forth, passing over the same bumps in the road and plunging through the same mud holes. By that means we become rather used to the peculiarities of our route, and these impediments are like old acquaintances.

There seems to be no good rule by which to calculate the value of prospective trips. One can never make a good guess whether a good load east means a good load west, or whether the noon or second trip will be made with a lighter or better load than that of the morning.

# GOOD ROADS MOST IMPORTANT.

Returning to the matter of roads, I wish to add some other thoughts. The good roads question is the one of first importance with those who are contemplating becoming owners of automobile lines for passenger and freight carrying. In this State considerable legislation has been enacted, but it has not been productive of better roads to any extent. One reason for the failure is to be found in the fact that no one is held responsible, either criminally or financially, for damages to vehicles directly chargeable to the conditions of the public highways. Officers having the roads in charge, township districts and counties should be held amenable, if they fail to make repairs after notice of the dangerous condition of any road, and any citizen should have authority to serve such notice in his individual name. Politics cuts some figure. The office of supervisor has in years past, and is now, looked on as one of no great importance, and is used as a crumb to be thrown to some of the small fry district and township politicians to hold them in line and keep them "up on the bit."

### ROAD MAINTENANCE.

The supervisors of roads should be men employed by the year to go over the roads of a certain district and put in their time each day filling small damp or wet spots before they become large mud holes, and leading the water from the roads. They should have two horses and a wagon and be well equipped with all necessary tools. Two days' labor should be represented by cash in the district treasury, and no man (or woman) should be allowed to vote who has not paid poll tax for road purposes. The supervisor should have authority to conscript men and teams for road work, for which he should pay cash at the prevailing prices. He should work out the taxes assessed, seasonably and judiciously. He should be under the control of some township or county officers, who, with the supervisor, should be liable, after notice, to parties injured in property or person because of the bad condition of roads or bridges. He, the supervisor, should be of good judgment, with no enemies to punish or friends to favor. He should be a good,

honest, independent gentleman, not a rude, arrogant, blustering bore, as is too often the case

All owners of automobiles should be active members of good roads organizations, and should keep the cause constantly before the public eye. Members of the Legislature, or, rather, candidates for the Legislature, who will not work and vote for good laws to make good roads should be permitted to pass by on the other side election day.

#### ORGANIZATION OF THE SERVICE.

Our company is known as the Valley Auto Company, Incorporated, and the officers are as follows: J. P. Darling, Nellie, Ohio, president; W. W. Frederick, Warsaw, Ohio, vice president; E. Z. Hays, Warsaw, Ohio, secretary, and E. M. Wright, Warsaw, treasurer.

We make two round trips daily, except when some attraction at the county seat demands more service, in which case we add a trip. We run 54 miles daily, the maximum speed being a mile in four minutes; we average about nine passengers per trip. The chauffeur and gasoline are the chief items of expense. Solid round tires, 41/2 inches in width, are used. We consume 2 to 3 gallons of gasoline per trip, and I gallon of oil. There was no public conveyance over our route before we put the auto on. We store our vehicle in a large shed, and have a man employed to go over it daily to tighten nuts, etc. Our driver was sent to the shop for a couple of weeks for instructions before we began running. We have a second man who got his training on the car from the first man. We do not insure, although we contemplate doing so. We have a guarantee for one year.

# Delivery Contract Service for New York.

The Motor Delivery Company, with offices at 141 East Twenty-fifth street, New York, and a garage at 3-5 Lawrence street, near 126th street, who were awarded the mail collection and transportation contract on Route 407,021, New York city, for four years at \$44,826 per year, also conduct a mercantile delivery service, furnishing cars on a yearly contract, with the distinctive bodies, painting and advertising desired by the merchant leasing them. Complete maintenance of the cars is assumed by the Motor Delivery Company, who also furnish the driver, but the merchant provides a man or boy to handle the goods. For this service the prices, on a year's contract, are as follows:

1,000 pound delivery	\$10.00	рег	day
2,000 pound delivery	11.00	per	day
2 ton truck	12.00	per	day
3½ ton truck	13.50	per	day
5 ton truck	15.00	per	day

In addition to these two lines of work a general garage business will be done, provisions being made for the handling of gasoline as well as electric cars. The president of the company, C. H. Bardwell, has

had an extensive experience in the handling of city and suburban express work, having been connected in an executive capacity with the Metropolitan, United States, American and National Express companies.

#### Commercial Notes.

It is reported that motor vehicles will shortly be put in service for the collection of the mails in Chicago.

The Post Office Department has leased a Brush car for use in mail collection and delivery in Atlantic City, N. J.

The Nashville Taxicab Company, of Nashville, Tenn., put three more Sultan cabs in service on August 4, and expect to add three more additional ones before the end of the month.

C. B. Saxby, a Hancock, Mich., liveryman, has opened a motor livery business in Hancock and Houghton, Mich., with two Franklin cars. One of the cars is to be stationed at the Douglas House, in Houghton.

Albert Shoaf, a rural mail carrier out of Petersburg, Ind., has purchased an automobile which he will use in delivering mail in the future. He figures that by using an automobile he can have about three-fourths of the day to devote to other interests. His route is 25 miles long.

The R. L. Morgan Company, of Worcester, Mass., are reported to have secured a contract for 100 trucks from the American South African Commerce Company, of Johannesburg, South Africa. The contract involves the sum of \$350,000. The trucks are to be used in connection with the mines of the company.

According to a report recently received by the Indianapolis post office, which on July I increased its automobile delivery and collection equipment from two to three automobiles, the vehicles are covering between 52 and 64 miles a day, and it is estimated that each of them is doing three times the work done by a horse wagon

It is planned to establish an automobile bus line between one of the traction terminals in Washington, D. C., and the heart of Rock Creek. Samuel Gassenheimer has applied to the District Commissioners for a permit. He proposes to run six cars, seating thirty to forty passengers each, and to charge to cents fare, with stop-over privileges at any point along the route.

The board of public safety, Indianapolis, is inviting demonstrations of motor fire apparatus, Fire Chief C. E. Coots having recommended that such apparatus be purchased. There is no appropriation for the purchase of such vehicles this year, but should demonstrations prove successful provision will be made in the annual budget for 1910 which will be sent to the city council within a few weeks.

Practically all ambulance work in Indianapolis is now being done by gasoline cars, which have proved practical for the purpose. The Indianapolis City Dispensary, Flanner & Buchanan and the A. M. Rags-

dale Company are those who have recently purchased such vehicles. The latter's car resembles a limousine, and has not the outward appearance of an ambulance. It is reported that the city will purchase an ambulance for the City Hospital.

R. J. Hofner & Co., furniture dealers, have opened a private garage at 104 West Thirtieth street, New York city, for their gasoline trucks.

# Tire Manufacturers Ask for Investigation of Illegal Combine Charges.

A Buffalo, N. Y., paper some time ago printed an article in which it was charged that a tire trust existed which could boost the prices of automobile tires at will, and in which an investigation of the alleged trust was demanded. Meanwhile seven of the largest tire companies in the country, viz., the B. F. Goodrich Company, of Akron, Ohio; the Hartford Rubber Works Company, of Hartford, Com; the Diamond Rubber Company, of Akron, Ohio; the G & J Tire Company, of Indianapolis, Ind.; the Fisk Rubber Company, of Chicopee Falls, Mass.; the Goodyear Tire and Rubber Company, of Akron. Ohio, and Morgan & Wright, of Detroit. Mich., have secured Job B. Hedges, of New York, as attorney, and requested United States Attorney General Wickersham to make an investigation of the charges. Attorney General Wickersham has instructed District Attorney O'Brian, at Buffalo, to immediately proceed with the investigation. In his letter to the Attorney General Mr. Hedges declared that if it was merely a question of any individual manufacturer being libeled by a newspaper, he could have recourse to ordinary procedure under State laws, but this was a case of damage to a whole trade, involving interstate relationship and violating national laws, hence the appeal to the National Government. If a conspiracy in restraint of trade did exist, he said, it clearly was the duty of the Attorney General to prosecute the manufacturers. If one did not exist then it became equally the duty of the Government to protect when public accusations had been made. The tire makers claim that they have no illegal combination, and if the charges cannot be substantiated a libel suit will probably be instituted against the publication making them. Who was behind the charges which were made in the Buffalo Courier of July 15 has not yet become known. The Buffalo A. C. has repeatedly been mentioned in this connection in the Buffalo papers, and it has also been asserted that a co-operative buying league with headquarters at Buffalo, which could not get the tire manufacturers to accede to its demands, had something to do with the case. The developments in the case will be awaited with interest by the trade.

# MINOR MENTION



The Economy Motor Car Company, of Joliet, Ill., has recently completed a light delivery wagon.

The Hercules Electric and Manufacturing Company, Indianapolis, Ind., are building an addition to their plant,

The Jackson Wheel Company, of Chicago, Ill., who plan to manufacture a spring wheel for automobiles, may locate in Waukegan, Ill.

The B. F. Goodrich Company Detroit branch has recently been moved from 266 Jefferson avenue to a new building at the corner of Woodward avenue and Garfield street.

H. E. Wilcox, of the Wilcox Motor Car Company, Minneapolis, Minn., recently visited Detroit, where he placed orders for the engines and other parts for the company's 1010 output.

A new company is being organized in Portland, Ore., for handling the White steam and gasoline cars. C. A. Eastman, of the San Francisco White branch, is at present in Portland.

The receiver for the Oscar Lear Automobile Company, Springfield, Ohio, has taken out a building permit for a \$1,500 addition to the plant. The company will install new machinery at a cost of \$7,500.

The Fiat Automobile Company, who have decided to locate in Poughkeepsie, N. Y., are soliciting bids on a large line of machine tools, including lathes, drill presses, milling machines, gear cutters, grinders, etc.

F. W. White, a negro rural mail carrier on rural Route No. 1, out of Argenta, Kan. has purchased a second hand motor buggy for use in covering his route. He has a route 28 miles long and delivers mail to 1.600 families.

Ralph Rogers, of Chicago, has constructed an automobile of the high wheel solid rubber tire type, and is in correspondence with F. E. Eagan, secretary of the Commercial Exchange of Burlington, la, regarding a plan to manufacture the car in that city.

An interurban automobile road of 2x6 inch timbers is to be laid down between Carrizo Springs and Asherton, Tex., according to report. The road is to be used for both freight and passenger haulage by automobiles, and is designed as a feeder for the Asherton road.

The business men of Rockford, Ill., are said to be of the opinion that an automobile factory would be of much value to the city, inasmuch as the skilled labor employed in automobile construction is well paid for. Many cars are being bought in Rockford, and it is thought if a machine was manufactured there it would be patronized by local buyers. It is not unlikely that an

effort will be made to organize a manufacturing company among local capitalists.

The Auto Parts Manufacturing Company, Muncie, Ind., are enlarging their plant.

The County Board of Minneapolis, Minn., has decided to purchase an automobile for the use of the county officials.

The Rider-Lewis Motor Car Company are just moving into their new factory at Anderson, Ind., and expect to be in running order early in the fall.

The Muncie Motor Truck Company, Muncie, Ind., are planning to build 500 trucks of a ton and ton and a half capaity. H. L. Warner is chief engineer.

The Wadhams Oil and Grease Company, of Milwaukee, Wis., has taken up the sale of Wallman pressed steel gasoline storage tank, which is placed underground, with a tube brass pump above.

It is reported that the Jonz Automobile Company, of Beatrice, Neb., will shortly be reorganized with increased capital. Besides the Jonz automobile a number of specialties are to be manufactured.

A new firm has been organized at Du-Bois, Pa., to manufacture agricultural machinery propelled by gasoline motors, and will also finish a number of automobiles left uncompleted by its predecessor.

The Roman Automobile Company, Philadelphia, Pa., have leased the property at 238-240 North Broad street for a term of years, at a rental of \$6,000 for the first year and an annual increase thereafter.

The Courier Car Company, which was recently organized by members of the Dayton Motor Car Company, in Dayton, Ohio, began work in the former plant of the Kinsey Manufacturing Company, on Wayne avenue, on August 2.

The Superior (Wis.) Iron Works are manufacturing a new gasoline traction plow invented by Robert Russell, of Stevens, Minn. The tractor has covered 10 acres a day in the tests. The Superior Works manufacture the entire machine.

The Police Department of Saginaw, Mich., has recently been provided with a motor patrol, and the city council has now decided to erect a brick garage of ample dimensions for housing the vehicle alongside of the police department building. An appropriation of \$2,000 has been made for the erection of the garage.

The Northern Pacific Railroad is having 250 cars built specially for the transportation of automobiles. Each car is designed to carry two autos. The cars are 41 feet long, 8 feet 6 inches wide and 10 feet 8 inches high. The doors on opposite sides of the cars are staggered so as to facilitate the loading and unloading of the vehicles.

The Crow Motor Car Company, Elkhart, Ind., has secured a three years' lease for the factory building at the southeast corner of North Main and Simonton streets from August 1. The building is a two-story brick structure, 60x300 feet, and was at one time occupied by the Soudan Bicycle Company. The incorporators of the Crow

Motor Car Company are Dr. E. C. Crow, M. E. Crow, and F. A. Howe.

The cars turned out by the Interstate Automobile Company, of Anderson, Ind., for the 1910 season will be fitted with the U & H master magneto as regular equipment.

The Speed Changing Pulley Company, Anderson, Ind., will confine their efforts this season to a \$650 car, with a two cylinder opposed water cooled motor, shaft drive and rumble seat, of which they expect to make 3,000.

The Illinois Automobile and Parts Company, Main and Globe streets, Peoria, Ill., will add an addition to their plant that will double their present capacity. The new building will be used as a display and sales-room and a storage warehouse.

The Standard Leather Company, of Pittsburg, Pa., which has recently passed under the control of William J. Harvey and George J. Lappe will in the future cater specially to the automobile trade. The company was organized in 1840 and has a capital stock of \$400,000.

The E-M-F Company, Detroit, Mich., has taken out a building permit for two new buildings to cost \$75,000. One will be a three story building 460x56 feet, to cost \$50,000, and the other 240x60, to cost \$25,000. The new buildings will be located between Clark and Scotten avenues.

W. E. Dudley, Grand Rapids, Mich., has established a sightseeing service with a three seated car, accommodating twelve to fifteen passengers, and makes a round trip through the parks and to points of interest in the city every two hours. He makes his headquarters at the S. A. Dwight garage.

The Wordingham Manufacturing Company, recently incorporated in Milwaukee, Wis., to manufacture foot horns and motor car specialties, are working on a new signal device on the lines of the talking machine. It is a steel disc and recorder attachment for the regular horns and is expected to pronounce entire sentences.

It is reported that the General Motors Company, on July 29, paid \$4,500,000 in cash to the stockholders of the Cadillac Motor Car Company, for the purchase of the company's business. Had the money not been paid before August 1, it is said that another dividend of \$150,000 would have been paid to the Cadillac stockholders.

At the conclusion of the recent meeting of vehicle manufacturers in Chicago it was announced that an increase of 10 per cent. in prices has been decided upon. In explanation of the move it was said that the prices of raw material had gone up and automobile manufacturers had drawn workmen away from carriage making by offering higher wages.

The Minneapolis (Minn.) Motor Drivers' Club has been incorporated and is endeavoring to secure a clubhouse. Both drivers and repair men will be admitted to membership, but two years' actual experience in either line of work is one of the conditions of admission. F. A. Ost is presi-

dent, Chris. Owens vice president, Matthew Miles second vice president, Oscar Hall secretary and George Gagney treasurer.

J. B. Miller, of Perham, Minn., has purchased a touring car for use in his livery. J. P. Larigue has designed a light delivery car with friction drive, to sell at \$1,000. It will be made by a concern in Chicago

well known as bicycle manufacturers. The Velie Motor Vehicle Company, Moline, Ill., have increased their capital stock from \$150,000 to \$250,000. The 1910 models of the company will be announced shortly. and it is said to be the intention of the company to turn out no less than 2,000 cars for the season of 1910.

The Motor Supplies Company has been organized in Philadelphia with Harry A. Housman as president and V. McC. Fulton as manager. The company will open offices and salesrooms on North Broad street. Mr. Fulton, the manager, is well known in Philadelphia trade circles, having been connected with the Foss-Hughes Motor Car Company and the Penn Automobile Supply Company for several years past.

# Club Notes.

An automobile club is being organized in Sterling, Ill. More than fifty car owners in the city have signed an agreement to join. An organizing meeting is to be called for at an early date.

An automobile club has been organized in Hannibal, Mo. The following officers were elected at the recent organizing meeting: Judge T. L. Anderson, president; Walter Logan, secretary.

The Rhode Island A. C., Providence, R. I., has made arrangements with the Narragansett Hotel garage on Dorrance street for the accommodation of club members who wish to leave their cars under cover. Club members may store their cars free in the garage at any time except between midnight and 7:30 a. m. Formerly the club had a station at the Rhode Island Motor Car Company garage at 69 Broad street

# New Building for Studebaker Philadelphia Branch.

The Studebaker Brothers Company of Indianapolis has been incorporated with the Secretary of State of Indiana to handle Studebaker-Garford, Studebaker E-M-F and Studebaker - Flanders cars. Temporary quarters have been secured at 214 West Vermont street, but a new building is at present being erected on Pennsylvania and New York streets to which the business will be moved about November 1. The building will have a frontage of 92 feet on Pennsylvania street and extend the full length of the block back to Susquehanna street. The following officers have been elected by the new company: Frederick Fish, president; Frank Staley, vice prestreasurer and general manager.

# Dealer to Market Car Under His Own Name.

The H. J. Koehler Company, of New York and Newark, N. J., whose New York office and salesroom is located at 1709 Broadway, will for the season of 1910 handle the Rider-Lewis and Hupmobile, and will also market their own car, known as the Koehler "40," which will sell at \$1,650.

# Death of Colonel Pope.

Col. Albert A. Pope, head of the Pope Manufacturing Company, of Hartford, Conn., and well known throughout the country as a pioneer bicycle manufacturer and good roads advocate, died at his summer home, Cohasset, Mass., on August 10. Colonel Pope had been in ill health ever since the collapse of the bicycle industry, and since July 9 last his condition had been serious, and his death had been expected. A short biography of Colonel Pope will appear in our next week's issue.

# Opening of Indianapolis Speedway.

It is understood that the five mile course of the Indianapolis Motor Speedway will be finished in ample time for the meet of the American Federation of Motorcyclists to be held on August 13 and 14. About 100,000 cubic yards of stone has been used on the course, together with about fifty carloads of pitch. The stone has been furnished by eighteen different concerns, no one plant being large enough to supply the stone as fast as needed.

# Allyne's New Foundry in Detroit.

An addition will shortly be made to the Detroit automobile and parts factories located on the Boulevard, the Allyne Brass Foundry Company having just purchased a site on Chene street, just north of the Detroit Steel Products Company. This site contains about 24 acres. It has a frontage of 498 feet and is 2,105 feet deep. The first buildings will probably be 350x350 feet, and will be equipped to handle about 36 tons of aluminum a day. The old plant on Bellevue avenue will be operated for a while as a brass foundry.

### Ford to Establish Branch Factory in Kansas City.

It is stated that the Ford agency in Kansas City, under the management of C. C. Meade, has done nearly a million dollar business during the past year. With an eye to future extensions in this territory the Ford Company has recently purchased from the George T. Moore Realty Company 31/2 acres of ground in Centropolis. This property is on Winchester avenue between Eleventh and Twelfth streets and just north of the Webster Gas and Gasoline Engine Works. It is understood that a one-story building of reinforced concrete will be erected at once, and that it will be used for assembling purposes. The building will be made heavy enough to carry additional stories.

### New Incorporations.

The Uptown Garage, Yonkers, N. Y .- Capital stock, \$2,000.

The National Motor Supply Co., Cleveland, Ohio.—Capital stock, \$10,000; F. M. Chandler, manager.

Lemey-Mills Auto Co., San Antonio, Tex-Capital stock, \$20,000. Fred H. Lemly, G. C. Mills and J. H. Gibson.

Caroline Automobile Co., Charlotte, N. C .- Canital, \$30,000. Incorporators, E. A. Robbins, O. A. Robbins and E. M. Bell.

Carolina Auto Co., Charlotte, N. C.—Capital stock, \$30,000. Incorporators, O. A. Robbins, E. N. Bell and E. A. Robbins.

Ogden-Farwell Garage, Milwaukee, Wis. ital stock, \$10,000. Incorporators, George F. Gerlach, J. M. Dorsey and A. C. Runkle.

Automobile Rim Securities Co., Brooklyn, New York.—Capital stock, \$150,000. Incorporators Harry Gargan and Paul G. Burroughs.

Ferris-Dunlap Motor Car Co., Dallas, Tex.—
Capital stock, \$10,000. Incorporators, Floyd A.
Ferris, O. E. Dunlap, Jr., and Neil White.
Keystone Auto Supply Co., Norristown, Pa.—
Capital stock, \$15,000. Incorporators, James S.
Boyd, John P. Leonard and Donald Stroud.

The Superior Motor and Machine Works, Superior, Wis.—Capital stock, \$15,000. Incorporators, Solon L. Perrin, H. J. O'Brien and H. C. Lavery. G. J. G. Motor Car Co., White Plains, N. Y.

—Capital stock, \$5,000. Incorporators, Mortimer M. Grossman, George Grossman and Matilda

Rooklidge-Gilmer Co., Salt Lake City.—Capital, \$25,000. Incorporators, John W. Rooklidge, presdent and secretary; L. J. Gilmer, vice president and treasurer.

The Brown Auto Carriage Co., Cleveland, O. Capital stock, \$15,000. Incorporators, Brown, H. E. Benfield, C. C. Wise, I. R. Graham and R. A. Wilbur.

The Schreiber Motor Car Co., of Milwaukee, Wis. (State agents for the Locomobile and Knox).—Capital stock, \$25,000. Incorporators, Herman F. Freidner, Robert G. Washold, John P. Foley and others.

The E. Z. Auto Go-Cart Co., of Beloit, Wis. has increased its capital stock from \$25,000 to \$50,000, and increased the number of directors from five to seven, by an amendment to its articles of incorporation.

The Instantaneous Lighter Co., Columbus, O.-A device which enables the driver to light all lamps from his seat. Capital stock, \$30,000. Incorporators, F. C. Bargar, president and secretary; Byron L. Bargar, treasurer; H. S. Barrett, director.

The Stearns Auto Livery Co., Milwaukee.— Capital stock, \$1,000. Incorporators, A. F. Eckstein, J. E. Moore and H. T. Eckstein. company is an auxiliary to the Wisconsin Auto Exchange, agents for the Stearns and other lines.

The Minneapolis Motor and Truck Co. has recently been incorporated with \$500,000 capital to manufacture commercial vehicles. A factory is to be erected at Ninth street and Ninth ave southeast. The incorporators include Frank Healy. Dr. W. B. Murray, Carl C. F. Budtz, Michael A. Gerber and H. H. Natwick. The first model turned out is a delivery car to sell at something less than \$1,000. It is provided with a platform body 9 feet 7 inches long and has a capacity of 1 ton. The engine is of the two cycle type and has three cylinders, and is rated at 25 horse power. It appears that the company will cater espe to the needs of the farmers. Trucks of large capacity, all equipped with three cylinder two cycle motors and shaft drive, will be brought out later.

# New Agencies.

Atlanta, Ga .- Tom Johnson, E-M-F. Sacramento, Cal.-Fred Kitt, Speedwell.

Vincennes, Ind .- Emison & Nicholson, Rambler. Tacoma, Wish., 751 Tacoma Avenue.-

tow, Palmer-Singer.

Jefferson, Wis.—Chas. F. Bullwinkel, Studenter. baker, E-M-F and Studebaker-Flanders lines.

# "Stables" Taken Over by Garage Firm.

The Imperial Motor Vehicle Company, New York city, have taken over the remaining one and half years' lease of the West End Stables of the building at 208-212 West Seventy-sixth street, and secured an extension of the lease to ten years. The Imperial Motor Vehicle Company have a capital stock of \$10,000. Harry Tonnell is president, G. W. Meade secretary and treasurer, Charles Bader vice president and F. C. Stinzing general manager. Mr. Stinzing formerly ran the Imperial Garage at 52-54 West Sixty-seventh street, the business of which will be transferred to the new company, and previously to that was connected with the Desberon Motor Car Company as designer.

The building is finely adapted to the purpose, having six floors and a basement, 75 feet by 92 feet 3 inches, with unobstructed light on three sides. Extensive alterations are being made, including the installation of steam heat on all floors, the boiler room in the basement being entered from the street only; cement floors in the first four stories, compressed air piped to all floors, a new elevator and electric lighting system using tungsten lamps. Storage for 1,100 gallons of gasoline is provided in a tank room at the rear of the building. The top floor will be used for painting and for the repair shop, in which will be installed a 32 inch lathe, a 13 inch metric lathe, a 24 inch drill press, a 12 inch drill press, shaper, power saw and forge, the latter being placed in a "lean-to" outside the building. It is expected to have everything ready for business by September 1.

# Wisconsin Auto Line.

The Appleton Auto Transfer Company has been organized at Appleton, Wis., with a capital stock of \$10,000, and the support of the Appleton Merchants' Association, to operate a passenger and baggage line ber tween Appleton and New London, Wis., via Black Creek, Shiocton, Hortonville and Stephensville. Two trucks, a twelve passenger and I ton truck, will be purchased. Two trips will be made each day, each truck starting at opposite points. M. D. Parmenter, secretary of the Merchants' Association, is manager.

# Imports and Exports for June.

During the month of June last there were imported 131 cars, valued at \$246,291, and parts valued at \$72,276, as compared with 71 cars, valued at \$153,521, and parts valued at \$61,927, during the same month the previous year. Of the cars imported last June 69 were from France, 44 from Italy, 9 from the United Kingdom, 6 from Germany and 3 from other countries. During the twelve months which ended with June, 1909, there were imported 1,624 cars, valued at \$2,905,-301, and parts valued at \$773,743, as compared with 1,045 cars, valued at \$2,500,134, ard parts valued at \$490,905, during the same period the previous year. The following table shows the valuation of our automobile imports during the past three Perry Hill from a standing start in 22 3-5 and Phillips Hill from a flying start in 28, giving him a total of 50 3-5. On Perry

T			-Fiscal Year I			
Imported from—		1907		-1908		1909. <del></del>
United Kingdom	103	\$347,758	65	\$199,377	100	\$226,050
France	841	2,940,387	793	1,775,589	1,099	1,838,65 <b>3</b>
Germany	61	252,062	32	124,747	64	193,580
Italy		420,154	132	331,363	328	561,620
Other countries	27	80,664	23	69,058	33	85,488

During June last there were exported 577 cars, valued at \$1,046,856, and parts valued at \$69,008, a total of \$1,115,864, as compared with 271 cars, valued at \$648,267, and parts valued at \$62,455, a total of \$710,-722, in June, 1908. During the twelve months ending with June, 1909, there were exported 3,184 cars, valued at \$5,387,021, and parts valued at \$605.170, a total of \$5,-992,200, as compared with 2,477 cars, valued at \$4,656,001, and parts valued at \$620,856, a total of \$5,277,847, during the fiscal year ended with June, 1908, and 2,862 cars valued at \$4,890,886, and parts valued at \$611,-355, a total of \$5,502,241, during the fiscal year which ended with June, 1907. The following table shows the distribution of our exports during the past three years:

	Fiscal Year	Ending W	ith June—
Exported to-	1907.	1908.	1909.
United Kingdom	1,530,304	1,796,609	1,812,091
France	512,524	692,365	661,525
Germany	155,623	178,914	141,056
Italy	254,694	247,357	241,660
Other Europe	288,921	186,968	329,170
British North			
America	1,175,334	951,386	1,692,980
Mexico	812,639	401,617	387,446
West Indies and			
Bermuda	207,390	250,201	255,158
South America	204,211	220,644	143,730
British East In-			
dies	34,608	29,510	23,853
British Austra-			
lasia	207,715	155,722	138,871
Other Asia and	*		
Oceania	97,050	135,938	101,048
Africa	8,874	7,329	41,428
Other countries	12,354	23,287	22,184

# The Algonquin Hill Climb.

The second annual hill climb of the Chicago Motor Club on the Algonquin Hills, about 60 miles from Chicago, took place on Thursday last, August 5. Numerous classes were provided for in the program and the number of entries was quite satisfactory, while the attendance was larger than at any hill climb previously held in the vicinity. The event is peculiar in a way in that there are two hills, Perry Hill and Phillips Hill. The Perry Hill was climbed in the morning, from a standing start, and the Phillips Hill in the afternoon, with a flying start, and the times of each car for the two hills were added. The chief prize offered in connection with the event is the Algonquin Trophy, donated by the village of Algonquin, which is awarded each year to the driver who makes the best aggregate time for the two hills. Lew Lengle, of Allentown, Pa., was the winner this year, and will have his name inscribed on the trophy, below that of Frank W. Leland, last year's winner. Lengle drove a Chadwick car. He climbed

Hill the old record was 34 1-5 and on Phillips 29 2-5.

Following is a summary of the results: Class A, Division 6, \$150 and under-Maxwell

(Marshall), 1:47 1-5 total time. Class A, Division 5, \$851-\$1,250—Mason (Dusenberg), 1:13.

Class A, Division 4, \$1,251-\$2,000—Oakland (Bauer), 1:11 3-5. Class A, Division 3. \$2,001-\$3,000—Knox (Deni-

son), 1:03 3-5.

Class A, Division 2, \$3,001-\$4,000—Stoddard-Dayton (Englebeck), 0:59.

Class A, Division 1, \$4,001 and over-Thomas Six (Greiner), 1:15 2-5.

Class G, for electrics—Babcock (Peck), 1:21 1-5. Class I, Motor Buggies—Holsman (Renegar),

1:54 3-5. Class B, Division 5, 160 cubic inches and under— Buick (Burman), 1:25 3-5.

Class B, Division 4, 161-230 cubic inches-Velie (Stickney), 1:03 4-5.

Class B, Division 3, 231-300 cubic inches-Corbin (Bird), 1:03 4-5.

Class B, Division 2, 301-450 cubic inches-Stoddard-Dayton (Miller), 0:55 2-5. Class B, Division 1, 450-600 cubic inches-Knox

(Denison), 0:53 3-5.

Class F. Division 2, 202 cubic inches and less-Velie (Stickney), 1:00.

Class F, Division 1, 390 cubic inches and less— Stoddard-Dayton (Miller), 0:56 2-5. Class F, free for all—Chadwick (Lengle), 0:50 3-5.

Amateur Championship-Thomas (Greiner), 0:53

# Indianapolis Enforces Registration.

Enforcement of the automobile and motorcycle registration ordinance in Indianapolis began on August 10, and it is estimated that 5,000 persons will have to be registered. A badge and an engraved card giving a de-/ scription of the person to whom issued will be given to each driver, and the fee will be \$1. The registration will not have to be renewed unless the former license is revoked for violation of the automobile

The ordinance requires that every person be registered, whether the owner of a car or motorcycle or not. The police have adopted an arbitrary rule that the badges must be worn in a conspicuous place, threatening to stop all drivers who do not wear badges.

In applying for registration the applicant is required to give the following information to the Board of Public Safety: Name, address, sex, color, date of birth, whether automobile or motorcycle is to be driven; kind of power, length of experience in driving, whether experience has been in driving in cities, whether or not applicant is familiar with laws governing automobiles and whether or not applicant has ever been arrested for violating such laws. Each application must be indorsed by two freeholders who know the applicant to be a competent person to drive.

# Garage Notes.

P. P. Belt has opened a garage and repair shop in Fredonia, Kan.

William Parkinson has purchased the garage business of the Overland Motor Car Co. at 16 Railroad place, East Orange, N. J., from Charles Reiss.

E. E. Lincoln, of the York (Pa.) Auto Co., has let contracts for a new brick garage on Lincoln avenue, between Seventh and Eighth streets.

The Franklin Motor Car Co., of Philadelphia, have bought a building site 40x120 feet at 3430 Chestnut street, on which they plan to erect a garage.

Smith & Morgan, Youngstown, Ohio, whose present headquarters are located on Tod avenue, have let contracts for a new garage building on East Front street.

West, Vail & Lincoln, Decatur, Ill., who some time ago built a 44x40 foot garage building, found themselves cramped for room recently, and are now erecting an 18x50 foot addition.

Stuart Pilcher, Nashville, Tenn., has secured the State agency and will shortly erect a garage, but for the present will make his headquarters at the garage of the Tennessee Automobile Có.

Brad McLeod, a railroad engineer, will shortly open a garage in Delphos, Ohio, in the Wulfhorst Building on North Main street. Nicholas Dienstberger will have charge of the place.

Fred Leinhard, Bellevue, Ohio, has purchased a building site on Main street and will erect a garage building. A salesroom in the building will be in charge of Charles Lamn, of Clyde, Ohio.

The Carolina Auto Co. has been organized at Charlotte, N. C., to handle Rambler and Regal cars. A salesroom and garage is now being erected on South Church street on a lot 50x150 feet.

The Miller Machine Co., a garage concern of Defiance, Ohio, has leased the old bicycle factory in that city and begun the manufacture of a large touring car, to be known as the Defiance "40."

The H. H. Franklin Manufacturing Co. has opened a Buffalo branch at 683 Main street, in charge of George Ostendorf. Mr. Ostendorf has been connected with the Franklin Co. for upward of four years.

Arthur Howard, who formerly represented the Ford Motor Co. in Joliet, Ill., and then gave up the agency, has reassumed his connection with the Ford Company, and will also handle the Brush runabout.

The White Co., of Cleveland, O., will erect a two story and basement fireproof garage building in Dallas, Tex., at a cost of \$50,000. It will be equipped with steam heat, electric light and power and an electric elevator.

C. L. Lidders will open a garage on Eighteenth street and Fourth avenue, Rock Island, Ill. A new building 25x152 feet will be erected. Mr. Lidders has planned to take the agency for a number of

cars. This is the seventh garage in Rock Island.

The New York branch of the H. H. Franklin Manufacturing Co. has leased a five story and basement building on Eightieth street, just west of Broadway, which will be used as a repair shop. The building has a frontage of 30 feet and a depth of 100 feet.

The Stevens-Sowers Motor Car Co. have been organized in Boston and secured headquarters at 821 Boylston street, from where they will handle the retail sales of Jackson cars in Boston. The former Jackson salesrooms at 26 Tennyson street will be used as a repair shop.

The Lemly-Mills Auto Co, have opened a new centrally located fireproof garage at the corner of East Houston and Nacogdoches streets. San Antonio, Tex. They have the agencies for Pennsylvania, Ford and Hupmobile cars, and request catalogues from accessories manufacturers.

The A. Eliott Ranney Co., of New York city, who recently took on the Hudson agency, in addition to that of the Elmore, have removed to larger quarters at 1928 Broadway. They formerly

osed of an allotment of seventy-five Elmore cars

tion for 400 Hudson cars, which naturally calls for more space.

Walter E. Cimiotti has opened a garage at 2906 and 2908 Broadway, New York. The building is 50x100 feet, fireproof, with air pressure system for inflating tires installed throughout the building. Lockers are on the balconies. The building has canacity for 100 cars.

has capacity for 100 cars.

The Mitchell Automobile Co., of Milwaukee, has started work on the erection of a garage and salesroom at Broadway and Martin street, adjoining the site for the new \$150,000 Central Fire Station. It will be of fireproof construction, one story high, and cost \$7,500.

The H. H. Franklin Manufacturing Co. have opened a local sales office in Syracuse, N. Y., in charge of George E. Messer, who was formerly district representative for the company in Kansas, Nebraska and Missouri. Heretofore the Syracuse territory has been covered direct from the Franklin factory.

The Essex County (N. J.) Overland Co., Newark, N. J., of which William F. Ackor is president and manager, has closed a deal for handling the Overland and Marion cars in Essex County outside the Oranges, Glen Ridge and Bloomfield, and will shortly open a salesroom and garage on Halsey street.

The Protheroe & McGinnis Auto Machine Company has been organized at Baraboo, Wis., by Robert W. Protheroe and James F. McGinnis Mr. Protheroe has been engaged in general machine work and has been agent for the Buick for several years, and Mr. McGinnis has purchased a half interest.

Bids for the erection of the new factory of the DeSchaum-Hornell Motor Co., at Hornell, N. Y., were opened on August 2 and ranged between \$26,700 and \$31,835. The buildings are to be completed by the middle of November. They will be of tile, brick and concrete construction and absolutely fireproof.

The McPherson (Kan.) Automobile and Garage Co. is erecting a new garage building 50x120 feet on North Main street. The floor of the garage is of brick, while the washstand has a cement floor. In the rear portion of the building there is a 50x30 foot repair shop. W. O. Talbott and N. J. Lorenson are the members of the company.

The Minneapolis Motor and Truck Co. has placed the contract for a three story manufacturing building of cement block construction, 165x275 feet, and two smaller buildings for the finishing department and the power plant respectively. The aggregate cost of the three buildings is said to be in the neighborhood of \$100.000.

The Bryant Motor Company, Waterloo, Ia., will erect a garage building on Jefferson street, between West Fourth and West Fifth streets. It will have a white enameled brick front with terra cotta ornaments, while the walls will be of cement blocks. The company has the agency for the Chalmers-Detroit car. Frank Bryant is manager.

The Auto Storage and Repair Co., Minneapolis, Minn., has leased space at 717-719 Hennepin avenue, where the Pence Auto Co. was formerly located. This company was organized to supply the demand for storage created by the recent ordinance making it unlawful to leave a car stand in the street. O. M. Holden is manager of the new company.

work on a new brass foundry building on its Rand drill property in Tarrytown, N. Y. The foundry is expected to be completed about September 1, and will employ about 100 men. The company formerly purchased its brass fastenings, but to insure prompt delivery it will now make the castings itself.

The Vanguard Automobile Supply Co., of Joliet, Ill., of which Charles F. Jensen is president, has decided to locate in a former mattress factory in Desplaines street, that city. At one time there was some talk of the company removing to the East, but it finally decided to stay. The space vacated by the company in its old building will now be used by the Steinhart-Jensen Company for shop purposes. The Vanguard Company will manufacture wind shields.

C. C. Slaughter, St. Louis agent for Stearns cars, has leased a garage in course of construction at 1026 South Olive street, at \$200 a month for five years. The building will have a frontage of 50 feet and a depth of 155 feet and will be one story high.

John S. Lazarus has sold the Meridian Place Garage, in Indianapolis, to C. W. Allison and A. L. Duggan, who have renamed it the Twenty-second Street Garage. It is located in the centre of the exclusive residence district and was built by Mr. Lazarus, a capitalist, for one of his sons.

#### Trade Personals.

C. L. Morgan has resigned as sales manager of the Auto Tire Security Co., of Chicago.

Lewis M. Crittsinger, formerly connected with the Chalmers-Detroit Motor Co., has joined the R. L. Morgan Co., Worcester, Mass., as purchasing agent.

Charles J. Forbes, of Cleveland, has resigned as secretary of the Ohio State A. A., and has been succeeded by Dr. A. B. Heyl, a member of the Cincinnati A. C. board of governors.

Joseph A. Anglada, a former member of the staff of THE HORSELESS AGE, has accepted the position of engineer and designer for the G. J. G. Motor Car Co., White Plains, N. Y.

R. C. Chidester, formerly connected with the Welch Brothers Motor Car Co., of Milwankee, Wia., has joined the Schreiber Motor Car Co., of the same city, as accretary and manager.

F. W. Steers, who was superintendent of the Oakland Motor Car Co. at Pontiac, Mich., for the past two years, has taken charge of the sales department of the W. H. McIntyre Co. branch in Minneapolis.

Fred C. Vanderhoof, who was formerly connected with the Philadelphia Ford branch and the Bergdoll Motor Car Co., has accepted the position of manager of the Philadelphia sales branch for Oldsmobile and Oakland cars.

John Almon and George Holland, of Decatur, Ala., have established an automobile service between Decatur and Curtis Wells, a mineral water resort 5 miles from Decatur. Large touring carare employed, and a number of trips are made every day.

Frank Bowen, who had charge of the agency department of the Ford Motor Co., New York, for a number of years, and was later connected with the sales department of the Thomas car department of the Harry Houpt Co. in this city, has joined the Carl H. Page Co., who handle the Chalmers-Detroit in New York.

Archie Hughes, formerly secretary of the Fos-Hughes Motor Car Co., of Philadelphia, has become vice president of the company, and John H. Fassitt has been elected a director of the company. Mr. Fassitt connected himself with the company as salesman some years ago, and later rose to the position of sales manager.

Frank Mueller, formerly superintendent of the Mack Motor Car Co., Allentown, Pa., and Joseph Matheus, who was employed in the engine department of the same company, are reported to have organized the American Eagle Motor Car Co. of New York, with a capital stock of \$150,000, of which they are manager and assistant manager respectively.

M. E. Crow, who was formerly connected with

M. E. Crow, who was formerly connected with the Elkhart Motor Car Co., of Elkhart, Ind., manufacturers of the Sterling car, has withdrawn from that company and organized the Crow Motor Car Co., of Elkhart, who will manufacture a car to be known as the "Black Crow." It is reported that two Indianapolis concerns have contracted for the entire output of the company for the ensuing year.

The International Engineering Co., 1779 Broadway, New York, have taken over the American agency for the Etablissements Lemoine, who manufacture axles, springs, forgings, etc. The agency was formerly held by Lavalette & Co.

According to J. S. Bretz, who is handling the U. & H. magneto in this country, of 264 models of American cars of the season of 1909 selling for over \$1,500, only thirteen were not fitted with a magneto regularly or at the option of the pur chaser without an added charge.

# The Horseless Age

First Automobile Journal in the English Language

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# Block Construction in Cylinders.

By N. C. DAY.

"Non-Bloc," writing in a recent issue of The Horseless Age, appears to be familiar with only one early type of block construction, to judge from his communication. He enumerates the objections to it as follows:

- (1) Foundry, machine shop and sectional damage risk.
  - (2) Absurdity of pipe elimination.
  - (3) Inequality of expansion.
- (4) Need of additional radiator capacity. These are the dear old arguments presented in the dear old way. Modern block practice was founded upon these arguments. Every designer who adopted the practice fought them all out over his drawing board and explained them away to the powers that were. So, while refuting them, it may be well to investigate the modern and future practice and remove the scales from the eyes of many who still have the same delusions as "Non-Bloc." Let us take the objections seriatim.

Foundry uncertainty—that is, an increase over the percentage of scrappage that occurs every day in every kind of work—is only present with an innovation in foundry work. This same argument has been brought up time and again in connection with siamesed cylinder construction, yet today the siamesed type of cylinders is predominant. The foundry risk and the machine shop risk are dependent entirely upon the design. The design which minimizes both is by the better designer. This applies to both the block and the pair castings.

Before going into the details of these matters let us understand our terms. Block construction to me means four or more cylinders cast as a unit. Siamesed or pair construction indicates the general construction with two cylinders cast together. In unit construction each cylinder is separate, with its own water jacket. These, I think, are the generally understood meanings of these terms.

# RELATIVE COSTS.

If we consider a T head cylinder type of each construction with integral water jackets, we have in each case cores within cores. With the single or unit construction the passages for intake and exhaust are, as a rule, simple bends, and may, if desired, be made in one with the cylinder and valve pocket cores. The water jacket core must be made in two halves in any case, pasted together about the central core, and must be supported at at least three points. This

makes the simplest form of cylinder molding, and the design involves less volume of metal to handle, less area of thin wall, less risk.

Now take the siamesed arrangement. We have cores within cores—a cylinder core, a jacket core in two halves and separate intake and exhaust port cores. The pattern is more complicated and the jointing of the water cores is also a little more complicated. The risk of metal not running is apparently higher, but any good foundry accustomed to such work will make the same price per pound as on unit cylinders, and give the same guarantee.

We now come to the block type. We have exactly the same conditions as with the siamesed type, aside from the necessity for larger areas of thin metal; but again we have the condition that, provided the patterns are approved by the foundry, and provided the slight changes that may be deemed necessary by the foundry are made, the price per pound still remains the same, as does the guarantee.

Hence, comparing the various types, we find that the relative weights are as I to 11/4 to 11/2, in good practice, for the block, the siamesed and the single construction, respectively. Therefore, if the cost of a four cylinder block be \$10, two pairs will cost \$12.50 and four singles \$15. The cost of the patterns will be as 1:21/2:31/2 for the single, the pair and the block. Depreciation on these, however, will be slightly less for the block, as the other patterns are lighter and so more prone to damage. Taking the cost of the single pattern as \$100, and the others in proportion, and supposing that 1,000 castings can be made from each pattern, we find that the additional cost per piece will be 10 cents, 221/2 cents and 35 cents, respectively, increasing the total foundry cost to \$15.40, \$12,95 and \$10.35 for the different types. These figures prove that the foundry risk, as it affects the manufacturer, is inconsiderable, except in its bearing upon machine shop risk, which risk we will now investigate.

# MACHINE SHOP RISKS.

The greatest machine shop risk is that of finding a foundry defect after work has been done upon the casting toward finishing it. If such a defect be found it is permissible to demand a new casting for it, but there is no means of retrieving the loss due to the work spent upon machining unless it happens continually, in which case

the cheapest remedy is a change of foundries, the more expensive a lawsuit.

Obviously the scrapping of a single block casting is a more serious matter than the scrapping of a unit, provided it occurs at the completion of the piece; but let us see how much this actually amounts to, inasmuch as the casting itself is a "no-charge," except as far as freight and work done is concerned.

On a unit we have the following operations: Cylinder boring, flange facing, head facing, intake and exhaust port facing, water intake facing and valve port boring. On a block we have the same series of operations, except that there are four cylinders, probably four exhaust ports, as a rule, but one intake port and one water intake, and four sets of valve ports to be bored. One milling operation is commonly performed with any type of cylinder. Then comes the boring, and it is during this operation that at least 90 per cent. of the faulty castings are discovered. The primary milling operation is more lengthy on the block type of motor, but the additional cost may readily be expressed in cents and mills.

Now we come to the boring. Boring is at present almost universally done on a double spindle boring mill, often a double operation mill. In manufacturing units two are handled at once, and on a block two cylinders are handled at once. As a rule, the first heavy cut in each case will "tell the tale." The work stops right there. Very little has been spent in either case, but the risk, except for the possible time loss, is the same in both cases.

### REDUCED HANDLING.

But think of the difference in handling! One setting for each operation finishes the block, while the number of settings is multiplied by four for the same work with the unit. Also, remember that the manufacturing limits for port face distancing in the case of the block need not be drawn so fine as with the units, for, though they be exceeded, the faces are still in one plane, and will remain so; whereas any variation on the part of the unit cylinder port faces, or variation in truth on the part of the base flange, will be extremely annoying at the time of assembling, and, worse than that, a trouble breeder for the manufacturer from the test block to the last resting place of the engine.

Beyond this the machine shop risk is a matter to be settled between the engineer and the tool designer. Obviously it is not desirable to have any light projections from a block, but this applies equally to the unit. It is better to have all operations in planes at right angles or parallel to each other, since multiple operation machines may then be used.

I write this in the light of a manufacturer who can equip for any type. The block construction is a thing not to be lightly undertaken by one having small equipment and no capital to invest in special tools. To be a success the block type demands good equipment for its handling, whereas the best that can be said of the unit type is that it is capable of manufacture in a jobbing plant.

#### RISK OF ACCIDENT.

Now look at the sectional risk. "Non-Bloc" refers to a scored cylinder brought about by lack of lubrication and the expensive renewal necessary. In the first place, my experience teaches me that if any one cylinder is damaged by lack of lubrication the other three are in a sad state, too, and it is better to renew all four. In the second place, granting such a condition to arise. it is cheaper in the end to renew the block, for, though its cost be higher (price lists show that the difference is small), the customer can assemble his engine again with the new block and be sure that it will run as well as it ever did. If he replaces or has replaced a unit it is a thousand to one that his engine will never run as well again.

### ADVANTAGE OF BLOCK TYPE.

The best argument in favor of the block type is that it never has air leaks in the intake system that cannot be located with certainty and stopped. The most insidious. elusive fault that can develop in an internal combustion engine is an air leak, no matter how slight, anywhere between the carburetor and the inlet valves. If you don't believe me, just try glands on the valve stems. With an integral intake there is only one joint, or there are at most two, to be looked after and to give trouble; with a pair type there are three or four. Pair type engines have been more satisfactory than unit built ones, chiefly for that reason. The block is better than either for regular running for that reason alone, apart from any advantages it may have.

This discursion from my heading answers the second as well as the first objection, but it is necessary to look at the "elimination of pipes" objection more fully. The real object is not the elimination of pipes, but the water jacketing of pipes. The pipes are there just the same; so far as mixture distribution is concerned there is little difference, and if any it is in favor of the enclosed manifold. As far as exhaust pipes are concerned, only one maker in this country has the exhaust passage in one with the block. The invariable rule among designers is to dispose of the exhaust as quickly as possible, get it out of the water jacket by the shortest path offering the least area; a rule that holds good. no matter whether a block pair or unit em be used.

Our friend "Non-Bloc" is entirely at sea in talking of the abolition of pipes. The only thing that would militate against the cast-in pipe is its comparatively rough interior surface, but the majority of inlet pipes are castings, anyway, without the advantage of the water jacket.

#### UNEOUAL EXPANSION.

Now as to inequality of expansion. Let us grant that we have a block in which the exhaust ports are short and direct, in which our water jackets are not tied to the cylinder columns and the contour of which is reasonably symmetrical—points which are the sine qua non of any cylinder design.

Suppose such a block to be in working condition. Without water we should find our exhaust ports and combustion heads hotter than the rest of the cylinders, the hottest being the curve of the exhaust port, the coolest the valve pocket on the intake side. This condition would exist in each cylinder. The water jacket wall on the exhaust side would heat from its junction with the exhaust ports, and from its connection with the valve plug bores. It would duly expand, tending to curve the axial line which normally would run through the centres of the cylinders. The exhaust side of the cylinders would by conduction be hotter than the intake side. Consequently each cylinder would have a tendency to be concaved on the inlet side.

Now imagine the same conditions with the jackets filled with water. Apart from any pump influence there would be a constant replacement of heated water with cooler. Consequently, until the boiling point was reached, and granting an absence of steam locks and obstructions, we should have a fairly even temperature of jacket water which, though it does not necessarily mean an even temperature of cylinder and combustion head wall, does mean a great leveling of temperatures, so that the distorting effect is slight enough to be entirely neglected.

Supposing, however, that it is great enough to concave the motor axis slightly, this would have no discernible effect whereas vertical distortion with obvious detrimental tendencies probably occurs in each and every type, and yet is disregarded. Hence, though the exhaust pipe be cast integral with the cylinders, its effect need not be a matter for disparagement, except for its effect upon the maximum temperature of the cooling water.

We have heard a great deal in days gone by about cylinder distortion under working conditions, yet it is ludicrous when one remembers that to this day many makers use a solid exhaust pipe and clamp it tightly to the exhaust flanges, which will cause a great deal of distortion a few minutes after the motor is started.

### RADIATOR SURFACE NEFDED

Now for the last count—additional radiator surface necessary. Why this should be so is hard to see. The jacket volume of a block is, as a rule, greater than that of any

other form: the block jacket is free from obstructions and less liable to become inefficient from deposits. The water is subjected to a definite cooling influence from the enclosed inlet pipe. The flow being unobstructed, the head necessary for circulation through the radiating system is less, and thus power may be saved. The block type is par excellence the construction adapted for thermo-siphon circulation. With this system not only is the power necessary to drive the pump saved, but some of the waste heat is utilized. The development of heat is no greater in a block motor than in any other type; its transmission of heat to the cooling water is more uniform. Why, then, should the radiator need more capacity?

Apropos of radiator capacity "Non-Bloc" may not know that this is more a matter of fashion than anything else. Chassis construction is nearly standard, radiator form is rapidly becoming more so. The width of the radiator is nearly fixed by custom and necessity, and certain heights are necessary for appearance' sake; likewise, certain outlines within narrow limits. Radiator capacity, then, is a question of radiator thickness. Radiator thickness is variable only within narrow limits with the cellular type, for the reason that special lengths of radiator tube for cellular radiators are difficult and expensive to get. Vertical tube radiators alone are flexible, but if the tube tiers are increased comparatively little is gained by the addition of the rear tubes. You will find little or no difference in the size of the radiator for a four cylinder, 5x5 inch engine and a six cylinder, 5x5 inch engine, since any difference would upset two things, viz., standard appearance and manufacturing cost. Such things are adjusted, if at all, by varying the pump capacity, or, if that is inconvenient, by changes in the fan draught. Doubling of the heat loss of the motor to the jackets is never allowed for by doubling the radiator surface.

# FAVORS THERMO-SIPHON CIRCULATION.

But to return to the block construction and radiator capacity. Since the heat developed by a block motor is not more than that developed by any other type, there can be no valid reason for increasing the radiator with any system of circulation; but where the thermo-siphon is used the block has a tendency to decrease the radiator need rather than increase it, for the primary needs of every thermo-siphon system, volume and ease of flow, are both provided automatically in the block motor. The most serious defect in a thermo-siphon system is a water leak, since the system is inoperative without a continuous aqueous circuit. The risk of such a defect is minimized with the block, since the water joints to the engive need not number more than two, as against greater numbers with other constructions, and, besides, the vibration to which they are subjected is less severe, and twisting strains are entirely absent. Hence the jacket volume being greater, the flow

.

freer, the opportunity for using liberally sized water leads greater, the vibration less racking, the water joints fewer, the chance for fatal leaks less—may not the radiating system for a block motor be designed to operate with less chance of failure than that of other types?

If "Non-Bloc" will ponder the question I think he will see that even the enclosure of the exhaust pipe may, with small motors, have a useful effect, for, being toward the cylinder head, the heat it imparts to the cooling water may materially aid the flow in a thermo-siphonic system. It is easy to see that its distortional effect is small if it is in contact with the cooling fluid. It will undoubtedly raise the mean temperature of the cooling water, which in itself is an excellent thing, inasmuch as almost all small motors run at too low a mean jacket temperature for the highest fuel efficiency.

#### RIGIDITY A FEATURE.

Let us consider some of the other advantages of the block motor. There is no need for ponderous crank case construction with it, since its form provides all the necessary rigidity. It can readily be designed to be supported on the main frame, by tubular cross members, for instance. The abolition of the sub-frame is desirable, yet hitherto a questionable move, since long crank chamber arms have been subject to breakage.

The block motor may be made shorter; so short, in fact, that a two bearing crank shaft may be used. Granted that the two bearing shaft has sufficient stiffness to support the bending strains imposed upon it, is it not an advance in mechanical efficiency? In any case the rigidity of the block tends to preserve the bearing alignment.

This same reduction in the over-all length of the motor permits of reducing the wheel base without changing the body location.

Considered as a manufacturing proposition, many less parts have to be handled. The block motor is an ideal proposition to "tool for"; less stock needs to be carried, there is less chance for trouble once the motor leaves the factory; it is less trouble to assemble, it is less costly, and last, but by no means least, there is less chance for the user to tamper with it when he gets it.

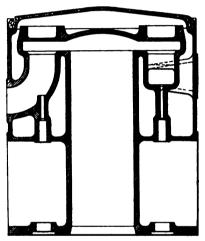
# FULLY ENCLOSED MOTORS.

The block motor is also much cleaner than its rival. It has no copper pipes and no bright parts to attend to, but is symmetrical and smooth, and requires a minimum of attention. Consider the ease with which all the valve mechanism may be enclosed, easy of access, yet protected from dust, lubricated and hidden from sight. The fully enclosed automobile motor is as surely the motor of the near future as the fully enclosed electric motor is the motor of today for traction work. I have heard it asserted that the fully enclosed motor has no high lights to take the eye, that it looks like a box. Let it! It will run sweetly and silently when the motor of appearance has pounded itself to the scrap heap.

A block motor may be made lighter, I believe, than other forms, but an extra light motor is not an unmixed blessing for automobile work. The block motor is, as a rule, cast iron throughout, crank case and all, and this is good construction. It is always hard enough to properly "spring" the front of a light car, but with a motor it is a case of hope deferred; an additional 50 pounds helps a great deal, both with springing and steadiness. What we need more than lightness are rigidity and permanent alignment.

#### A SUGGESTED DESIGN.

Having gone so far in discussing block construction, I would like to suggest a block type that to my mind has many points to recommend it. Its chief difference from usual practice is the feature of complete water jacketing—port plugs and all. The section herewith clearly shows the idea.



BLOCK CYLINDER DESIGN.

The top water cover completes a total water jacket about the cylinders. Apart from the fact that such a design would provide the simplest form of block casting it would permit of higher compression being satisfactorily used, would remove hot spots and make a much cleaner engine than any other form.

The valve guides would be water jacketed and packed, the valve springs acting as an automatic take up for the glands. Covers can easily be applied to encase the valve stems, springs and tappets.

It will immediately be claimed that the construction is one tending to inaccessibility. That is true; and were valve grinding a daily or even weekly necessity it would not be permissible. But valves rarely need grinding, and the jacketing of the port plugs would make it much rarer still. In any event, the top cover is easily removed, since, as a rule, all valves are ground at the same time.

Sheboygan, Wis., now has 146 motor cars, with a population of 22,000. On August 15, 1908, only seventy-two cars were listed.

# Maintenance and Repairs



#### Brazing.

By A. P. Press.

Although one of the oldest of shop operations brazing is nevertheless one of the least understood. Every smith from Tubal Cain down could braze a piece of work, but how many of them can tell before they do it that it will be a good job and what pressure it will stand? A joint well cleaned and brazed will stand strain nearly equal to the tensile strength of the metal itself. A machine steel collar I inch long with a I inch hole brazed to a piece of steel tubing stood a strain of 50,000 pounds, with no signs of starting.

The first requirement for a good job of brazing is to clean the work thoroughly; that is one-half the secret of a good brazed ioint. No brazer can make a good job of a dirty or poorly cleaned joint; he may boil out the dirt and grease, and finally get a good joint of it, but it is a sloppy way to go about it. The cleaning operation should be a mechanical one; that is, not wholly a wash or dip, but it should be finished with a file and emery cloth. Sand blasting is the ideal method for cleaning work for brazing. It not only cleans the metal of all scale, but it penetrates the pores of the iron itself, and leaves it in a condition to receive and hold the brass, and also does it at less cost than any hand method.

### FLUX.

While good borax, burnt and ground fine, makes a good flux, there are several compounds on the market that will give better results than the borax. If wanted for a quick job that is to be brazed at once, mix borax with wood alcohol, or, better still, with what is known as "Columbian Spirits," but if this is not at hand, clean water is nearly as good. Mix the compound or borax to a thin paste, and apply with a thin brush, so as to wet thoroughly every part of the joint before the same is put together. After the job is assembled and pinned, paint about a half of an inch each side of the joint with a mixture of machine oil and black lead. This holds the flux in place, and also stops the spelter from running each way from the joint and leaves the work so that it is easier to clean and finish up. A joint should be pinned to hold it in place while being brazed. Run a No. 29 drill through the job and use an 8 penny wire nail. This makes a good pin for any work of I to 2 inches diameter.

### HEAT.

Any clean fire will do for a job of brazing; it may be gas, coal or oil. A gas fire is by far the best, and though the cost is greater than for an oil or coal fire, better results can be obtained by the use of it. There is on the market at least one brazing table that will effect a saving in gas and

still turn out good work. It is simple, cheap and it will pay for itself in a very short time. Put the heat on the heavy part of the work first, so as to bring it nearly up to the brazing point, so that when the heat is put onto the joint the heavy metal will absorb it and cool off the part to be brazed. Bring it slowly up to a bright yellow heat, and as the spelter and flux begin to melt, dip the brazing wire in a mixture of the spelter and borax or brazing compound and apply to the joint. Before dipping the wire hold it in the flame so as to heat it as near as possible to a melting point and still not melt it. As the flux and spelter melt turn the work so it will run to all parts of the joint, and while still turning remove it from the fire and keep it in motion till it "sets." If it is a large job that cannot be handled in this

#### CLEANING OFF THE WORK AFTER BRAZING.

manner turn off the heat and allow the blast to strike the work and cool it off.

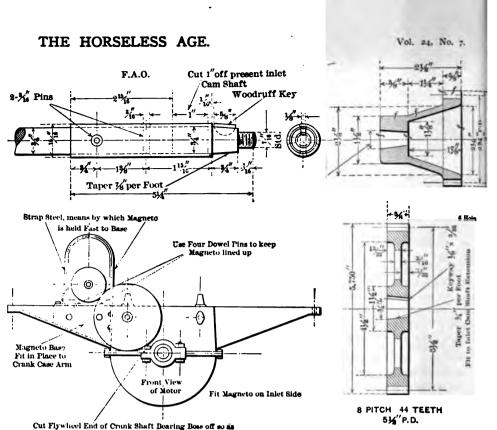
There are several methods of cleaning the work after brazing. If you have a sand blast use it, as it has no equal for that purpose. The next best method is pickling in a weak solution of vitriol and water, about I quart of vitriol to a barrel of water. This is not so good a method as the sand blast, especially for tube work, as any acid left in the tube eats the metal and weakens the ioint. The sand blast leaves the work clean and ready for the file, and also shows up all the imperfections in the brazing. An old fashioned method of cleaning the work is as follows: When the work is nearly cool, dip it in a pail of soap suds; this starts the flux and impurities and does not harden the metal. It is not recommended as good practice.

### COST.

When work is done on the premium or piecework basis the cost can be made very low, as high as 1,800 to 2,000 joints being brazed in a day of ten hours. Ordinary automobile work can be brazed at a cost of 50 cents per hundred for small work and as high as 4 or even 6 cents per joint for the larger parts.

### DIP BRAZING.

Dip brazing can be practiced on certain classes of work, and at one time time was used extensively in the bicycle trade. The cost of the work is far lower and the cost of cleaning is a trifle as compared with torch work.



PARTS USED IN FITTING U. & H. MAGNETO TO MODEL S BUICK.

#### CAST IRON BRAZING.

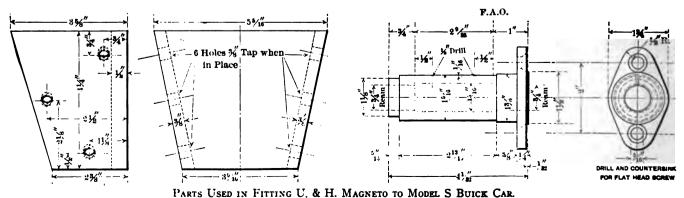
to Clear Cam Shaft Gear

Almost any kind of a broken joint of cast iron can be brazed, and, if well done, will be stronger than it was before breaking. The broken jaw to a 41/2 inch bench vice brazed some two years ago has been in constant use ever since, and shows no signs of giving out. To make a good job, first heat the work to a dull red; this takes the dirt and grease out of the pores of the metal; next clean the work with the sand blast or with a wire brush if the blast cannot be had; next apply the brazing powder to the broken surface of the work. This leaves the iron in condition to take and absorb the spelter. Then fasten the broken parts firmly together, either by putting in a screw or by holding them together with a twisted wire. Now place in the fire and bring up to a bright yellow heat; in fact, almost to the melting point, and apply the brazing compound. Then shut off the gas and allow it to cool without moving. There are several cast iron brazing compounds on the market, but the method is practically the same with each.

# Fitting a U. & H. Magneto to a Model S Buick Car.

Many of the older and lower priced cars have no provision for fitting a magneto, and as this device needs a very firm foundation, in a point where it can be placed in driving connection with the motor, fitting of a magneto is often a rather difficult problem. Joseph Tracy, of New York, has fitted a U. & H. magneto to his 24 horse power Model S Buick car, and as the arrangement adopted by him may be of interest to other owners of cars, we describe it herewith. All of the parts necessary are shown by the accompanying working drawings.

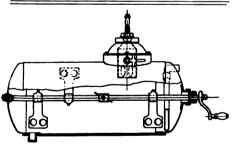
In looking the car over before commencing to make the drawings Mr. Tracy found that the only alterations to be made would be on the right hand side of the motor. Here the main feature in the way of placing the magneto was the shape of the curved gas inlet manifold. This was removed and replaced with a perfectly horizontal one, as shown in the photograph. There being no further use for the battery which was carried under the rear turtle



deck, it was removed also. The coil was removed from the dash, and as the magneto carries its own timer internally, the timer was removed, and the timer shaft hole in the crank case covered up with a plate cover, bolted on as shown in one of the drawings. The extension of the cam shaft which carries the gears to drive the magneto was carried out through a blind hole in the forward end of the crank case, and all that was necessary to do there was to remove the cover of the hole. The bed plate in the arm of the crank case on which the magneto rests was made of bronze, and after everything had been fitted it was found to be as easy to crank the motor, Mr. Tracy asserts, as it was previously to start on the battery.

Mr. Tracy has fitted a small Yale lock to the dash of his car which locks the bonnet in place and also cuts out the ignition. He also removed the spark lever and its connection, as with the magneto he runs on a fixed spark.

Henry Sturmey, the well known British manufacturer and writer, who recently returned home from a visit to Warsaw, Russia, where he secured an important order for taxicabs, reports that the one difficulty he had in arranging terms with the purchasers was in connection with the double horse power rating of his cabs, they being 12-16 horse power. The Russians simply could not understand how a motor could be a 12 horse power and a 16 horse power at the same time; they thought there was some trickery connected with the double figures, and Mr. Sturmey was asked through the interpreter to remove the "12" from the specifications before the contract was signed.



F1G. 2.

#### Construction Details of Motor Fire Engines.

By F. A. EISNER, M. E.

About a month ago the writer witnessed a demonstration of a modern fire automobile in Buffalo, and became so interested in the matter that he made up his mind to study the construction of the present fire automobile more closely. What impressed him most in connection with this demonstration was the immediate supply of water

which transports both the men and the hose. In the following I will give a description of the fire engine which was demonstrated at the time spoken of in Buffalo, and which, as I found out later, was constructed by the Webb Motor Fire Apparatus Company, of Vincennes, Ind. The chassis is a standard construction of the E. R.



Fig. 1.

thrown to a height of about 210 feet as soon as the connections were made and the fire engine was stopped, the absolute absence of smoke and the ease with which the machine was handled in all the different stages of the trial. Every horse drawn steam engine has certain weak points which cannot be overcome, but in order to give the atuomobile the advantage over this old fashioned vehicle these weaknesses ought to be eliminated in the designs of the motor fire trucks.

At present the most essential features are absolute running and pumping reliability, quick starting and stopping ability, and large capacity for carrying fire extinguishers, ladders, hose and other articles required in fire fighting. Furthermore, each engine ought to carry all the men required for making hose connections, regulating the speed of the pump and directing the jet of water in an efficient way, so that the car, when arriving at the scene of the fire, is not required to wait for another truck

Thomas Motor Company, of Buffalo, N. Y. The wheel base is 131 inches, with a total length of frame of 174 inches. The wheels are 40x6 inches, extra heavy, and carry quick detachable pneumatic tires. springs, of course, have to be pretty heavy, in proportion to the load carried. The main gasoline tank is a pressure tank, and is located in the rear of the car between the two rearmost cross members. The gasoline is forced from here through a pipe to a small gravity tank under the front seat. The engine is of the four cylinder type, with magneto and battery ignition, with a bore and a stroke of 5½ inches each, and is rated at 52 horse power. The clutch is of the usual Thomas construction, being a three plate disc clutch. There is a long connecting shaft between the clutch and the transmission, which latter is of the selective type. The rear wheels are driven by two side chains, and there are two external transmission brakes and two internal rear wheel brakes, the latter being operated by the brake hand lever. The construction of pedals and hand levers used for applying brakes and changing speeds is conventional. The above described chassis is used both for the chemical engine and the rotary pump, a description of which will be given later. The chemical engine is shown in assembly in Fig. 1.

The tank of the chemical engine is situated behind the driver's seat on top of the body panels, and in the rear of the same is located a basket or reel, according to special requirements, which is used for the chemical hose. Fig. 2 gives the assembly of this chemical tank and shows that there is in the dome of the tank a bottle of sulphuric acid which is turned over and emptied when the pump is to be started.



Fig. 3.

The contents of the tank consist of 30 or 40 gallons of a saturated solution of soda in water, and there is an agitator provided for which may be turned by a crank outside of the tank to more thoroughly mix the acid with the water when pumping begins.

The body of this truck also carries 1,000 feet of hydrant connection hose, two hand extinguishers, axes and ladders, and there is place for seven firemen in the seat, on the rear step and the running boards. The chemical engine is, of course, most useful for fighting small fires or where there are powerful hydrants, so that employment of a pressure pump can be dispensed with when fighting the flames. Where there are no sufficiently powerful hydrants in the neighborhood, or when the fire has become too large to be extinguished with small streams of water, a pumping engine will be required. An assembly of this truck is given in Fig. 3.

The pump is shown in Fig. 4 assembled on the frame, but without couplings, dome or hose connections, and in Fig. 5 disassembled. It will be seen from this figure that the pump is mounted between the transmission and the clutch, and is driven by means of a pair of spur gears, one of which is fastened on the left hand pump shaft, while the other is sliding on a square of the clutch connecting shaft, and can be thrown out or brought into connection with the pump gear at the will of the operator. The pump is a rotary pump, and the two pumping gears fit closely to the walls of the housing. The shafts are carried by ball bearings on each side of the housing, and the stuffing box is constructed in a very ingenious way, being very small and easily tightened. (Both the ball bearings and the stuffing box construction are

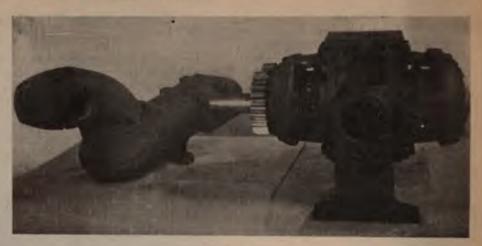


Fig. 5

covered by patents.) Outside of the driving gears the shaft of the pump is supported by a Hess-Bright ball bearing, mounted in an oiltight housing, which is carried by a special cross member bolted to the side members of the frame, and there is another ball bearing provided for which is used for stiffening the clutch connecting shaft and is carried by a second special cross member. This connecting shaft is, of course, of heavy construction, since in addition to supplying power to the transmission it must withstand a vertical pressure delivered through the pump driving gears. The smaller pump driving gear is, as I stated before, slidable on the square part of the clutch connecting shaft, and is put in action by means of a fork which is fastened to a shaft held in place by bearings bolted to the side members of the frame, and to which is attached a hand lever. Through this shaft, which is constructed as a steel tube, goes another shaft, bearing on the right hand side a second hand lever, and on the other side a small lever which throws the clutch out when the car is standing and the pump is not in action. This second pair of hand levers is seen in Fig. 4, and is placed somewhat behind the first pair of levers, which are of the normal construction, one being used for gear shifting while the other applies the rear brakes, and the only difference is that the brake shaft is not connected in any way with the clutch throw-out. This connection is left off because the car has to be held in place securely by means of applying the rear wheel brakes, and at the same time the driving shaft is required to revolve in order to drive the pump. It is hardly necessary to state that the transmission is running free while the pump is driven, and vice versa.

The question of how to cool the engine while the car is standing and the motor is driving the pump is solved in a very ingenious way, there being an eighth of an inch tube connection between pump and motor cylinders, through which is forced a constant stream of cold water as long as the pump is working. The water flows from the front cylinder to the radiator and leaves the latter through the wide overflow pipe.

The pump described above is guaranteed to throw 700 gallons of water per minute, but it actually throws 1,000 to 1,100, and produces a vacuum of 26 feet. The weight of the car fully equipped, with tanks filled, but without hose or men, is 6,000 pounds, and there are places provided for ladders. hand extinguishers, lanterns and axes and 1,000 feet of hose is carried in the body. Furthermore, there is room for seven men, as stated before, so that when the engine reaches the scene of the fire it has neither to wait for the hose wagon nor for the truck which transports the firemen, and all the men are available as soon as the ear stops, except one who has to handle the pump, but nobody is needed to hold the horses, stir the fire under the boiler or do similar duties. Larger cars, with more powerful pumps, are equipped with six cylinder motors.



Fig. 4.

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## Methods of Determining the State of Charge of Vehicle Batteries.

The most animated discussion at the Chicago meeting of the Society of Automobile Engineers centred around the question of the best means for determining the state of charge of automobile batteries. From the list of papers presented at the meeting it will be seen that quite a number related to some phase of electric vehicle work, and it was evident at the meeting that among those in attendance many were interested in this branch of the industry. This may be taken as another proof of the present activity of the electric vehicle branch of the industry, which has been referred to repeatedly in these columns.

Recently a tendency has been noted to use electric vehicles more for drives of considerable length into the country, instead of merely for short business or pleasure trips in the city, and this necessitates the provision of some reliable and convenient means for ascertaining at any time how much of the original charge still remains in the battery. When the battery is nearly discharged the driver will be apprised of the fact by a perceptible reduction in the vehicle speed; but if he is on a trip to some

point at a great distance from charging stations this warning comes too late to be of service. A charge gauge or charge indicating device is really essential for a vehicle used for such service. If the vehicle battery were fully recharged at the end of every trip the odometer might be used for keeping track of the charge, but it is at best a very imperfect instrument for this purpose, as the mileage which a battery will give on one charge varies considerably with road conditions, load and method of driving, and the odometer, of course, measures only the mileage accomplished.

There are at present three methods available for determining the state of charge of a storage battery, viz., a voltmeter test, a hydrometer test and the use of an ampere hour meter. Up to lately the voltmeter test was most largely depended upon, but the voltmeter reading is not at all a satisfactory indication of the state of charge of the battery. Until about three-fourths of the charge is taken out of the battery a relatively large discharge results in only a very small drop in voltage, and the voltmeter indication is therefore a rather uncertain index of the amount of charge remaining. Near both ends of the discharge curve the voltmeter serves very well; it indicates quite accurately when there is very little or nearly a complete charge in the battery, but near the middle of the curve, where the greatest accuracy is often required, as when a run is made out into the country and the driver wants to know when to turn back, the voltmeter method is not at all sensitive.

The defect of the voltmeter is absent in the hydrometer method, which is based on the fact that the density of the electrolyte varies from about 1.200 at charge to about 1.120 at discharge. Sulphuric acid is withdrawn from the electrolyte and taken up by the active material in direct proportion to the discharge current, and the density of the electrolyte varies therefore practically at a constant rate with the discharge between the two limits. The objections to the hydrometer method are based mainly on its inconvenience. It is necessary to remove the plug from one of the cells and siphon out some of the electrolyte, and after a reading has been taken to drain the electrolyte back into the cell and screw back the cover plug. This method is not at all adapted for the use of ladies, many of whom now drive electric runabouts.

The latest and best method of determin-

ing the state of charge is undoubtedly by means of an ampere hour meter. Until recently there was no instrument sufficiently rugged to withstand the vibration of road work, all such meters being designed for house installations. It seems, however, that now the problem has been solved and a simple, sturdy instrument has been produced that meets all the requirements of vehicular service. With such an instrument on an electric car it will be possible to utilize a greater percentage of the total charge stored in the battery, and the driver should enjoy more peace of mind than if he could only guess at the amount of "juice" remaining to carry him home.

#### Lubrication of Brake Linkages.

The development of convenient and complete provisions for the lubrication of motor cars forms a very interesting chapter in the annals of the automobile industry. Gradually the parts of the mechanism which have been neglected in this regard are receiving the attention which they deserve, but the work is not yet completed.

Upon the majority of cars no facilities are provided for the effective lubrication of the operative parts of hub brakes. These linkages are sometimes quite complicated, relating as they do to two sets of brakes and including a considerable number of bearings upon which move parts that are subject to very frequent use. No part of the car is more exposed to mud and dust than are these linkages, and their inaccessibility tends toward their neglect. Any looseness in the bearing pins of the levers forming these linkages gives rise to a disagreeable rattling, especially as these parts are not spring supported, and if the looseness resulting from wear progresses too far, or if the bearings become dry from an entire absence of oil, uncertainty in brake operation may actually develop.

These parts are generally lubricated, if at all, by means of the squirt can, oil being applied to the crevices between the moving and stationary parts, on the chance that it may find its way to the bearing surfaces. As the parts are always gritty, such lubrication is at least highly ineffective.

Upon a few of the later models it is to be noted that attention has begun to be paid to the lubrication of these parts. On some of the larger parts small compression grease cups are to be found, and upon the smaller members oil cups with spring retained caps are provided. This practice must be carried out consistently, and all

moving parts of the brake operating mechanism at the hubs must be cared for, or the result will be only partially satisfactory.

If an automobile is to wear well as a whole, every moving part and not merely almost every important part must be provided with means for insuring a clean oil or grease supply to the wearing surfaces, with the minimum of inconvenience upon the part of the attendant. In the case of a mechanism so essentially dirty as an automobile, squirt can lubrication of the hit and miss variety ought to be eliminated.

It is to be hoped that this practice of providing adequate lubrication for the rear axle mounted brake mechanism will be generally adopted in the interests of durability and satisfactory operation.

## Spring Suspension on Next Season's Cars.

The 1910 designs which have so far appeared seem to show that semi-elliptic front springs and three-quarter elliptic rear springs will be the most popular types during the coming season. Of course, there will, as usual, be all sorts of combinations. On some of the larger cars semi-elliptic springs will be used all around, while on a few of the lighter machines a complete equipment of full elliptic springs will be retained. But in the majority of cases the semi-elliptic springs will be used in front and either full or three-quarter elliptics at the rear. When full elliptic springs are used at the rear some means must usually be provided both for pushing the car and for taking the torque reaction, for, although both of these functions may be combined in springs of this type, there are comparatively few designers who care to make the springs heavy enough to withstand the stresses, most designers claiming that to do so makes the spring hard riding.

Where the three-quarter elliptic rear springs are used, however, the front ends are usually made stiff enough to push the car. This leaves only the torsion to be taken care of by external means. It is probable that even this can be well taken care of by securing the spring seats to the axle and making the spring somewhat heavier. This is often done with semi-elliptic rear springs, apparently with good results. The same objections may be urged as were mentioned in connection with full elliptic springs, but they apply here in a lesser degree, for only the forward part of the spring need be made heavy to take the torque and to deflect under the heavier

actions, while the rear portions may be arranged so as to give the necessary flexibility when passing over small obstacles.

Other tendencies which may be noted in the designs of next season's springs is that they are generally made wider for a given weight of car than formerly, and have less arch for a given length. Both of these changes tend to make the cars easier riding.

#### Forced Induction Motors.

In England renewed attention seems to be given recently to a principle in gasoline engine operation which in a somewhat different form was exploited by a number of inventors in this country in earlier years. Abroad it is referred to as the forced induction principle, and the chief characteristic is that the cylinders receive a greater charge per power stroke than the volume of the piston displacement at atmospheric pressure. Perhaps the simplest way of operating an engine on this principle is to draw the charge into the crank chamber of a double opposed engine and transfer it to the two cylinders alternately. As the pumping capacity of the crank chamber of such an engine against atmospheric pressure is twice as great as required to keep the cylinders supplied with charge at atmospheric pressure (neglecting the effect of gaseous friction), it is evident that a considerably greater charge than that corresponding to atmospheric pressure can thus be gotten into the cylinders in this way.

In the English engine above referred to the same object is attained in a somewhat different way, in that the engine is built with five power cylinders and one air compressor cylinder, and air is stored under pressure in a tank from where it is led to a sort of carburetor spray chamber, and thence to the engine cylinder. Consequently, the fuel, instead of being drawn out of the spray nozzle by atmospheric suction, is ejected by a powerful ejector action. The inventor claims for this engine that it produces a very much greater mean effective pressure than the ordinary engine, and that, since the power strokes overlap, the engine will start automatically in either direction, and no change gear is required on a car.

It seems to us that the abolition of the change gear, which seems to be a hobby with a certain class of inventors, is of very questionable advantage. It requires an exceedingly big engine in proportion to the weight of the car and the load to be car-

ried, and the tendency among owners seems now to be all the other way, owing to the great expense of such engines. The "forced induction" engine would, besides, be a less economical engine as far as fuel consumption is concerned, because the charge is expanded less than in the conventional engine. Taking this disadvantage in conjunction with the complication entailed by the compressed air installation, forced induction device and the spring supported and ring packed inlet valve guides, it would seem to us that the advantage of self starting is secured at rather too high a price, for cars of moderate size at least.

#### "Bench Assembled" Parts.

It is evident that in the present search for economical methods of manufacture the cost of assembling is receiving a good deal of attention. This is shown by the tendency to make the car from a number of "units," each of which may be quickly assembled on a special bench fitted for the work. Each of the units is secured to the frame by a few bolts which can be quickly fastened, so the actual work of assembling the chassis only takes a fraction of the time formerly occupied when other methods were employed. For this reason much less space is needed to assemble a given number of cars in a season, since the chassis assembly floor does not need to be nearly as large as formerly, and the sub-assemblies are compact and quickly handled.

Where the main work of assembling is thus sub-divided the workmen become more strictly specialists than where they more from chassis to chassis doing certain operations. Moreover, the working parts may usually be more accurately adjusted, so there is probably a saving in the time of running in.

From the standpoint of ease of repair and replacement the "unit" system of construction is superior to any other, so we may confidently expect to see it adopted on all cars used for business purposes as well as upon pleasure vehicles which are manufactured in very large numbers.

#### Coming Events.

August 31 or September 30—Milwaukee (Wis.)
Annual Orphans' Outing, Milwaukee A. C.
September 6-11—Lowell (Mass.) Annual Moss

Carnival, Lowell A. C.

September 15—Denver (Col.) Start of Flagts
Flag Race to Mexico City, Denver M. C.
October 7—Philadelphia (Pa.) Second Annual

October 7—Philadelphia (Pa.) Second Annual 200 Mile Stock Chassis Race in Fairmount Park Quaker City M. C.

November 6 to 13—National Automobile Show under the auspices of the N. A. A. M. at Atlanta Ga.

#### The Taximeter Cab in Chicago.

By E. L. W.

Chicago, "the city of distances," though at first rather chary about discarding the horse-drawn cab for the more modern taximeter cab, has gradually been forced to recognize the newer method of transportation.

Owing to the almost absolutely level topography and the unsurpassed boulevard system, the Queen City of the West has always classed as one of the best selling centres in the United States, especially for American cars, foreign cars never having secured much of a foothold in the Middle West The automobile livery or renting business has also thrived, and owing to the immense amount of capital invested in cars that were used exclusively for renting, when the taxicab first made its appearance in European centres, and in New York, the concerns interested in the livery business, whether using horse or motor cabs, naturally used their best endeavors to prevent it from gaining public favor. However, the traveling public gradually forced the various companies to adopt this cheaper and more popular means of transportation. and at the present time there are several large concerns with considerable capital behind them doing business in this line, and all of them are constantly increasing their rolling stock as the demand warrants.

A recent strike of the drivers of horse-drawn cabs and carriages greatly helped to establish the motor cab. During this strike it was almost impossible to even conduct a funeral without police protection, and the Chicagoans were treated to the novel spectacle of automobile funerals, bodies of hearses being removed from their usual running gears and placed on automobile chasses, the mourners, etc., following in either taximeter cabs or touring cars, for which latter a flat rate was charged.

The total number of taxicabs and touring cars with taximeter attached in service in Chicago is approximately 250. The total number of horsed cabs and hacks is 700. These figures are from the city clerk's office. As a number of concerns and individuals have not yet paid their wheel tax it is impossible to secure the exact number of either class, but the above figures are nearly correct. The wheel tax for either a taxicab or a touring car, either private or public, is \$20 per year. A license ice of \$5 per year is charged for hacking on streets. None of the operating companies conduct private service to individuals or clubs at a flat rate per month.

THE OWEN H. FAY LIVERY COMPANY.

One of the largest and oldest livery concents in the city, the Owen H. Fay Livery Company, who formerly operated some 200 horse-drawn vehicles and maintained stands at the most prominent hotels, having become disgusted with the numerous strikes and various troubles with their drivers, have gradually disposed of their stock of horseflesh and carriages, until they are now operating about thirty-five horse-drawn vehicles, and even this number is to be still further reduced, Mr. Fay stating that the only use they now have for the horse-drawn vehicle is to carry patrons from the various downtown hotels to the railroad depots. In the downtown section traffic is always more or less congested, and the horse-drawn vehicle can travel as rapidly as the motor-propelled vehicle, hence there will probably always be a few horse cabs used in this service.

The Owen H. Fay Livery Company's main office and stable are centrally located, at 53 Plymouth court, within a block of the Chicago Automobile Club, and in close proximity to the leading hotels. A branch office and stand are maintained at 244 Michigan avenue, which premises are also used as a salesroom, the company having the local agency for the Franco-American Taximeter Company and also the Central Western agency for Elmore cars. The main office and stable at 53 Plymouth court are located in a five story brick building 75x100 feet, which was originally used by the company exclusively for the horsedrawn livery business. At present it is being entirely remodeled into a modern garage and repair shop, which will be used exclusively for cars operated by themselves and when completed will be the largest and most pretentious garage devoted to the taxicab business in this section of the country. At the present time they are operating twenty-one Elmore taxicabs, ten Woods electrics, with taximeter attached, two large sight-seeing cars, and twenty Elmore touring cars. These latter have taximeters attached, and can be rented either as touring cars or taxicabs. When desired as touring cars a neat rubber cover is placed over the taximeter, shielding it from view, it being placed low on the side of the car adjoining the driver's seat. Special limousine bodies are at present being constructed for winter use on these touring cars. Mr. Fay expresses the opinion that within another year the stock of cars in operation will be tripled. During the summer months a victoria top covering the rear seats is in use on these cars, which gives them a very natty appearance.

All taximeters are attached to the front wheels. No special arrangement as to maintenance is in force with the manufacturers of the cars, but since the Fay Company are agents for the taxis they carry on hand a full line of extra parts. A mileage contract on tires was made when the company first started, but on account of the tires exceptionally giving more mileage than the contract called for, this contract has been discontinued. Quick detachable rims are used, but no spare wheels are carried. They operate their own vulcanizing department, which is in charge of

an expert secured from one of the large tire manufacturers. All inner tubes are repaired by him, but all casings go back to the factory for retreading, etc. Whenever a front tire needs replacing a tire is taken from one of the rear wheels and placed on the front one, and a new tire goes to the rear. The average mileage of the tires is about 4,000. Should a driver be careless enough to drive on a flat tire, he is instantly dismissed as an incompetent. This company have tried both commission and salary arrangements with their drivers, and have concluded that the best service is secured from the driver who receives a regular salary. It is claimed that the driver working on a commission basis rushes over his calls with but the one idea, of getting back for another load, and that the car is consequently subjected to rather harsh treatment as a rule. At the present time all drivers receive a straight salary. \$16 a week being paid to the drivers of taximeter cabs, and \$18 to those operating touring cars, with 25 cents additional per hour for overtime. A chauffeur found guilty of drinking when in charge of a car is instantly dismissed. As many of these chauffeurs were originally drivers of horsedrawn vehicles it has been necessary to enforce rather rigid rules in this regard. As is well known, the majority of "cabbies" were in the habit of drinking rather heavily, and relying on the good sense of the horse to always find its stable. The motor car, however, needs more attention, so that the Fay Company make it an "ironclad" rule that drivers must not drink under any circumstance while in charge of a car.

No hackney stands are operated by this concern. They have contracts with the Congress Hotel Company and the Annex, the Great Northern Hotel, Palmer House, Hotel Stratford, Hotel Brevoort, Union League Club and Chicago Club. At each of these places an employee is on hand to receive orders, and a private wire to the nearest of the two stations brings a car in a very short time. A commission is paid to the hotels for this exclusive privilege. It is necessary for the driver of a car to return to the station and check in after each trip; the meters are then read, and the car is looked over before responding to the next call. The rates of hire for from one to four passengers are:

50 cents for the first mile;

10 cents for each additional quarter mile; 10 cents for six minutes' waiting.

Four dollars an hour is charged for taxicabs, and \$5 per hour for seven passenger touring cars. Mr. Fay states that the dead mileage of cars going and coming from calls is the one great drawback to the taximeter cab business, as fully 40 per cent. of the total mileage of the cabs is dead mileage. The busiest hours are from 10-11 a. m., when the cabs are much used by business men for making rush calls, 2-3 p. m. (visits and shopping), 5-6 p. m. (to the limited trains), 8-9 p. m. (to theatres), and 11-12 p. m. (returning from theatres).

#### THE AUTO TAXICAB COMPANY

at 2441-2443 Michigan avenue, with a North Side branch at 733 Wells street, are operating fifty taximeter cabs, forty of them being Renaults and the other ten Berliets. In addition to the two garages they have stands at the Sherman House and the Illinois Athletic Club, where cars are continually held for hire. They aim to keep enough cars at each stand to meet the demand for same. As a car leaves the stand the fact is telephoned to the main office. and another cab is sent to replace it, the one that has been used either returning to the North or South Side office when dismissed, or if in the vicinity of the stand it returns there, the idea being to cut down dead mileage as far as possible.

About 50 per cent. of these cars are equipped with Stepney spare wheels, the rest are fitted with Fisk demountable rims, and it is the intention of the company to equip all new cars with the latter. That the number of cars will be increased is an assured fact, but no definite information could be obtained as to the number or make of new cars to put in the service. Franco-American taximeters are in use, and are attached to the rear wheels: The drivers of the cars receive both a salary and a commission. The company furnish all supplies and make all repairs, etc. No special agreement is in force between the manufacturers and this company as to maintenance. Tires are purchased on a guaranteed mileage basis. As a rule the busiest hours are from 5 to 7 p. m., when cabs are in demand by those dining out, and between 8 and 9 p. m. and 11 and 12 p. m. by the theatregoers. The cabs are much in demand on rainy days, as well as on the occasion of sudden showers, which catch the shoopers downtown without protection from the elements. The same charge is made for either one or four passengers, the rates being as follows:

For first mile	\$o . 50
For each quarter mile the	reafter
For each six minutes' wai	ting
For one hour's continuous	service 4.00
For four hours' continuou	s service 14.00
For five hours' continuous	service 17.00
For six hours' continuous	service 20.00
For every hour in excess	of six hours 2.50

There is no extra charge made for baggage carried inside the cab, but a charge of 20 cents is made for each piece of baggage carried on the outside of the cab.

To illustrate how the taximeter cab has grown in popularity in Chicago it might be well to state that this company have been in existence just one year. In the summer of 1908 they began with nine cabs; they gradually increased the number of cabs until now they are operating fifty, and they will continue to add to the number.

THE WALDEN W. SHAW AUTO LIVERY COM-PANY,

located at Twenty-first street and Michigan avenue, occupy a three story brick and concrete building, covering a space 60x130 feet. The two lower floors are used as relestoom and garage, and the upper floor

as repair shop. This concern was organized in October, 1908, and began business with twenty-four touring cars and two taximeter cabs. At the present time they are operating twenty-five Thomas taximeter cabs and six Atlas taximeter cabs, in addition to a number of touring cars, which latter are rented by the hour only. Thirty Jewel-Keating taximeter cabs for the exclusive use of Chicago's new hotel, "The La Salle," are under construction, and it is safe to say that before the expiration of the present year this company will be operating not less than 100 taximeter cabs. This firm is referred to as the "Contract Company," the reason being that they have contracts with the majority of the hotels and clubs to furnish cabs. It is claimed that the average gross earnings of the cabs in use are \$27 a day. The average mileage of each car is approximately 700 miles a week. Drivers are paid on a commission basis, they receiving 20 per cent. of the gross earnings. The management of this concern claim that the drivers working on a commission basis give better service to patrons than those receiving a salary. They contend that the man working on commission strives to please the patron so as to hold him as a regular, and, further, that as all of their drivers are competent and well versed in the operation of the automobile, such a thing as abusing a car is unknown with them. Extreme precautions are taken to prevent the overcharging of passengers. All drivers are under a cash bond, which is held thirty days after dismissal, and this bond is held as a sword over the head of the driver and practically forces him to be honest, both with the firm and its patrons. Drunkenness or dishonesty is met with instant dismissal, and in case of dishonesty prosecution is sure to follow. Gasoline, oil and repairs are paid for by the company. Jones taximeters are used and are operated from the left front wheel. For the purpose of checking the mileage shown by the taximeter Veeder odometers are attached to the right front wheel. This makes it impossible for the drivers to falsify the mileage records. An accurate account has been kept as to the average number of passengers carried per trip, and it has been found that but 17 per cent. of the loads exceed two persons. hence the rates are the same for either one or four passengers. In their touring car and limousine service the rates of hire are: For one or five passengers, inclusive, per hour \$5; for each additional passenger, extra, per hour, \$1. Time is computed from the moment the car leaves the garage until it returns. The taxicab rates are as follows:

For each quarter mile thereafter ... 30 cents
For each six minutes of waiting ... 10 cents

No charge is made for calls provided the customer rides as far as the car had to travel to reach him. The hourly rate is the same as that shown in the table of the Auto Taxicab Company. All cabs are

equipped with Fisk demountables, and a mileage contract exists between the company and the tire manufacturers.

CHICAGO TAXICAB COMPANY.

The largest concern in the taximeter cab business in Chicago at this time is the Chicago Taxicab Company, with a main office at 1322-24-26 Michigan avenue. This company has been organized only recently. It is incorporated under the State laws of Illinois, with a capital stock of \$500,000. It is an amalgamation of several companies formerly operating in a small way, including the Dan. Canary Taxi-Livery Company, Chicago Auto Livery Company. Kenwood Taxicab Company and the taxicab department of C. A. Cov Auto Livery Company. The officers of the new concern are Alderman A. B. McCoid, president; J. S. Kestner, of the Fair Department Store, vice president; Fred R. Upham, secretary; John R. Thompson, treasurer of Cook County, treasurer, and Dan Canary, general manager. In addition to their main office and garage they maintain various offices and stations scattered in the more thickly populated districts of the city where possible patrons reside. They are operating seventy Thomas taxicabs, nine Atlas taxicabs, and three White steamers, with taximeters attached. In addition to these they also have twenty seven-passenger touring cars of various makes, which are rented only at a flat hourly rate. The rates of hire for taxicabs are the same as those shown for the preceding companies. In addition to their various hacking stands, they keep a few "cruising" cabs." These continuously "float" around the downtown streets, especially during the evening, looking for fares. While they are "cruising" the "vacant" sign on the taximeter stands upright. This idea of course is a survival of horse cab days.

Mr. Canary states that Chicago will eventually have the most perfect taximeter cab service in the country. At the present moment he is working on a system by which the main office will practically be able to tell the whereabouts of any cab in their service, whether engaged or disengaged, at any hour of the day or night. He has promised a description when this system is perfected. The cars now in service are equipped with Jones taximeters which are attached to the front wheels. Some few of the cars carry Stepney spare wheels, but the greater majority carry Fisk demountable rims. It is the intention of the company to increase its number of cabs in the very near future, negotiations at present being under way for 100 new cars. These are not as yet contracted for, but the company are considering bids from several concerns relative to them.

The drivers are hired on a commission basis, the company furnishing oil, gasoline, etc., and a strict adherence to the rule of avoiding liquor when on duty is enforced.

In addition to the companies mentioned in this article there are several smaller

.

concerns operating from two to a dozen cars, and maintaining various stands at prominent corners of the city. The rates charged for hire are uniform with those charged by the larger companies, and as a rale the drivers work on a commission

#### AUTO LIVERY COMPANIES.

Following is a list of the companies doing an auto livery business in Chicago: tony Auto Surrey Company, 1710 Indiana avenue. ( W. Motley, 344 Michigan avenue, Was Pay-More Auto Livery, 205 East Twenty-

eighth street.

Adlake Auto Livery, 5039 Cottage Grove avenue. Auto Taxicab Company, 2441 Michigan avenue. Central Auto Livery, corner Jackson boulevard and Franklin street.

Central Garage Auto Livery, 276 East Fortieth street.

Colonial Auto Livery, 50 East Thirty-ninth street. Erwin Greer, 2213 Cottage Grove avenue. Huguelet Brothers, 204 Lincoln Park boulevard. Walden W. Shaw Auto Livery Company, Twenty-

first street and Michigan avenue. C. W. Miller Auto Livery Company, 418 East Superior street.

H. G. McGaughy, 67 East Eighteenth street. Owen H. Fay Livery Company, 53 Plymouth place. W. M. Traut, 243 Michigan avenue. Chicago Taxicab Company, 1322 Michigan avenue.

> Motorcyclists' Meeting at Indianapolis.

About 500 motorcyclists from all parts of the country attended the convention and meet of the Federation of American Motorcyclists at Indianarolis August 10-16. Preliminary to the convention there was an endurance run from Cleveland, Ohio, to Indianapolis, a distance of 362 miles, and the closing two days, Saturday and Monday, included races at the Indianapolis Motor Speedway.

There were ninety-six entries in the endurance run, of which sixty-five finished with perfect time scores and thirty-eight with perfect technical scores. The first day's run was from Cleveland to Columbus, via Coshocton and Newark, and the second day's run from Columbus to Indianapolis, via Dayton, Richmond and Conpersville.

On the second afternoon of the run there was a hill climb at Connersville, in which seventy-two negotiated the hill without penalizations.

1 motorcycle parade on Thursday afternoon and short runs to places of interest in Indianapolis and vicinity formed the principal features of the program. The Indiana Motorcycle Club kept open house at its clubhouse for the visiting riders.

#### New Body Building Concern.

The Glascock Brothers Manufacturing Company, Muncie, Ind., have recently started work on a brick addition to their factory on Fifth street and Perkins avenue, and upon its completion will take up the manufacture of automobile bodies. W. L. Cortelyou, an expert body builder, has been engaged as superintendent of the new department. It hopes to begin operation October 1. The company is capitalized at \$130,000, and John J. Dow is president.

#### Notes on Lubricating Oils.

(Presented by Frank H. Floyd, of Detroit, Mich., to the Society of Automobile Engineers.)

The important points respecting the use of oils are as follows:

That your cars are all carefully tested before placing them in the hands of the purchaser, and are in first class working shape.

That it is well to exercise careful judgment in purchasing oils, for their lubrication, that the wear and tear may be prevented.

That oils are usually sold under brands. and mean nothing.

That it is the property tests of an oil that determine its value as a lubricant.

That in analyzing numerous brands of oil on the American market the writer finds that they are strictly hydrocarbon oils, fractional distillates of crude petroleum, but of various specifications.

Fractional distillates are the different portions that are evaporated from crude petroleum by the refiner.

Gasoline, from 68 to 87 gravity; naphtha, 58 to 60 gravity; kerosene, 46 to 48 gravity; miners' oils, 38 to 49 gravity; light lubricating, 33 to 35; medium heavy, 22 to 31; heavy oils, 18 to 27 gravity, are fractions. True, oils are treated, filtered, etc., but in the rough they are parts of the crude.

That crude petroleum from different States, different wells, produces lubricating oil of entirely different properties under the same methods of refining. There is a choice.

That hydrocarbon oils employed in gas engine lubrication are by nature composed of hydrogen and carbon.

That the weight of oil is controlled largely by the amount of carbon in composition. That in practice the heat generated in gas engine cylinders is sufficient to cause all oils to evaporate and burn to a greater or less extent.

That in evaporating and burning the hydrogen is driven off by the heat, leaving the carbon to precipitate or pass off with the exhaust.

That there are no oils that will not deposit carbon when they burn, and no oils that will stand the high temperature at the point of explosion without burning.

That water and air cooling keeps the temperature of the metals down to a practical lubricating basis.

That oils of light weight (high gravity) contain less carbon in composition than oils of low gravity (heavy weight) and with deposit less when they burn.

That the evaporative or flash test, and the burn test of an oil is important to consider in conjunction with gravity.

That high, evaporative test and light weight oils will be less affected by the cylinder heat and will deposit less carbon when they burn. The desideratum.

That the viscosity or body test of an oil should be considered in transmission and in lubricating journals and shafting in the crank case, but in cylinder lubrication it is impossible to refine high gravity, high evaporative test oils with little body.

If both are high the body test will take care of itself.

That high grade gas engine oils are filtered to lessen the carbon and the gravity is raised, and the weight reduced as well as the viscosity, but the fire test is not affected.

That the various colors of oil are due to the bleaching effect of the filtering medium.

That color alone is not an index in determining a good gas engine oil.

That the cold or fluid test is important to consider at low temperatures.

That manufacturers will do well to regulate the temperature of oil in the receiver to get a uniform flow in all seasons, and not necessitate a change in the specifications of the oil.

That, finally, a good gas engine oil is one of high gravity (light weight), with a maximum high evaporative test, and a fluid oil at low temperatures.

That there are limitations in refining oils from high grade crude.

That you should consider all of the property tests of an oil in purchasing and not pick out one as an index.

I think the above covers much that can be said about gas engine oils.

#### Oakland Fours to Be Made in Jackson, Mich.

It is reported from Jackson, Mich., that the old Buick plant in that city will shortly house the factory for Oakland cars, which are now controlled by the General Motors Company. After the plant had been idle for some time a force of men was set to work several months ago to renovate it, and then several hundred tool makers were put to work in the plant making tools for the different General Motors factories. The tool makers will vacate the building by August 18, after which, it is said, the necessary machinery for the manufacture of the four cylinder Oakland cars will be installed.

#### Made to Suffer for Sins of Predecessors.

The Brush Chicago Motor Company has protested against a ruling of Chairman Chas. P. Root of the Chicago Motor Club contest committee barring the Brush from the Algonquin Hill Climb because of the advertising done by the Chicago Brush agents after last year's Algonquin contest. The Brush Chicago Motor Company were established in February last, and they claim they should not be held responsible for the acts of a former agent. The manager of the agency states that the manufacturers in all their advertising stated that the Brush had won in its class, and not that it had won the hill climb.

The date for the Olympia (London) Show has now been set for November 12-20. The annual dinner of the Society of Motor Manufacturers and Traders will take place November 10.

## NEW VEHICLES



#### Knox 1910 Models.

The 1910 line of the Knox Automobile Company, of Springfield, Mass., will consist of three models, as follows:

Model R, four cylinder, 40 horse power. Model M, four cylinder, 48 horse power. Model S, six cylinder, 57 horse power.

These ratings are based on the A. L. A. M. formula. All of the cars follow the same general line of construction as previous Knox models, and are provided with any of a number of different styles of bodies, including five and seven passenger touring cars, tourabout or close coupled bodies, tonneauettes, single or double rumble sportabouts, raceabouts, limousines and landaulets.

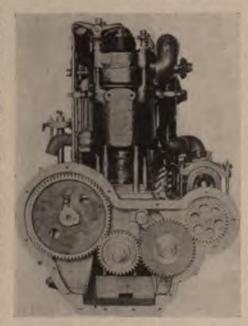
The Knox cylinder construction remains the same as it has been during the past two years; that is, the cylinders and cylinder heads are cast separately, each with its own water jacket, and are bolted together without water spaces at the joint, the jackets of the cylinders and heads being placed in communication by outside connections. The Model R cylinders are of 5 inch bore and 434 inch stroke, and the Model M cylinders of 51/2 inch bore and stroke each. All of the cylinders are cast separately, and a copper-asbestos gasket is placed between the cylinder and the head. One advantage of the separate head construction is that the combustion chamber may be machined all over, which makes it possible to secure absolutely equal compression spaces in each cylinder, and in addition gives a smooth surface, to which carbon will not stick as fast as to the ordinary rough casting. The water jacket of the head is cast with a division, making two chambers, so as to insure positive circulation directly over the valve seats. The U connection between the cylinder and head jackets is held in place by a double clamp and single bolt.

The Knox Company are now using flat head valves in all their motors, all of the valves being located in the head and operated mechanically by rockers and push



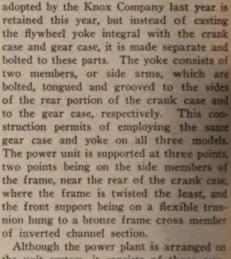
KNOX MODEL R.

rods. The upper ends of the push rods are in the form of hardened, cup shaped sockets, and screw in the ends of the rods for adjustment of the clearance. They are securely fastened by lock nuts, and the outer ends of the rockers with which they en-



FRONT VIEW OF MOTOR.

gage are ball shaped. These sockets are oiled to prevent wear. Spiral springs are provided for taking up lost motion in the valve mechanism, and thus insure quiet operation.

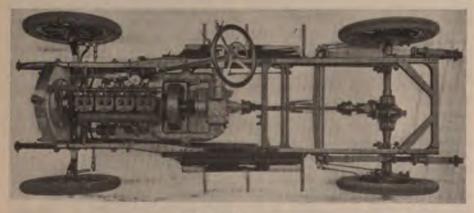


The unit power plant construction

Although the power plant is arranged on the unit system, it consists of three separate parts, any one of which can be removed without disturbing the others. The whole power plant can be taken from the chassis by taking out four bolts and uncoupling the forward universal joint, the muffler pipe, the ignition wires and the throttle and brake connections.

The crank case consists of four aluminum castings, the case proper, the bottom or base, and the timing gear case and cover. The case proper has a massive extension cast on at each side at the rear, which when finished makes one part of the forward joint of the yoke. This part supports all of the crank shaft bearings. The bottom of the case acts mainly as an oil reservoir, and is easily removed. The crank shaft and connecting rod bearings are lined with Parsons white brass, which is claimed not to injure the shaft in case of lack of lubrication. The connecting rods are drop forged from nickel steel, and have their heads fastened with four bolts, with contracting double lock nuts. The four bolts are said to make it impossible for the bearings to wear more on the ends than in the centre.

The Stromberg automatic carburetor is used. Ignition on Models M and R is by Bosch high tension magneto, and by battery, vibrating coil and timer, making two complete systems with two sets of plugs. The magneto is driven by enclosed gearing from the cam gears, and the battery



PLAN OF CHASSIS.

by spiral gears from the oil pump

cooling water is circulated by a cenal pump, which can be easily removed. drive is through a special spring conn, which will snap in case the pump d freeze up or be blocked in any other The pump can be completely drained. water is delivered from the pump gh a tapering manifold to the lower of each cylinder jacket; it passes out upper end of the jacket through the le connecter into the lower chamber e head, thence to the upper chamber out of the right side, through the remanifold to the top of the cellular radi-

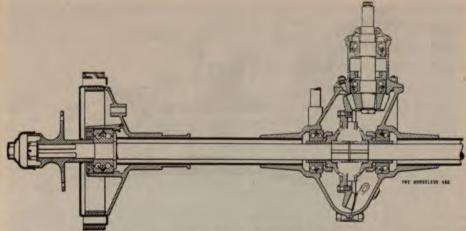
The action of the radiator is asby a six bladed fan postively driven leather covered chain belt running on red wheels. The belt is kept taut autoally.

motor is lubricated on the pump ciron system, a gear pump drawing oil



BRAKE.

an oil well at the bottom of the crank through a strainer, and delivering it various bearing surfaces of the mo-This pump is also driven through a connection, which will snap in case nump should become clogged. A ere gauge in the oil circulating sys-



SECTION OF REAR AXLE.

tem, located on the dashboard, shows at all times the pressure of circulation, which can be varied by means of an adjustable spring by-pass located on the left side of the motor. It is claimed that with this system of lubrication I gallon of oil will last for over 500 miles of ordinary running.

The power plant is slightly inclined downwardly toward the rear, so as to obtain a straight line drive. A new type, three speed selective change gear is used on Models R and S. The shafts and gears are made of nickel steel, and mounted on Hess-Bright and F. & S. imported ball bearings. The gear is very compact, the short shaft being only 5 inches between bearings. A change gear clutch is provided to prevent clashing of the gears in shifting.

The rear axle is of the semi-floating type, constructed so the shafts can be removed without dismounting the axle. The shafts are of 11/2 inch nickel steel, and a bevel gear differential is used. The rear axle is equipped with New Departure double race ball bearings, which take care equally of radial loads and side thrust, Four double race bearings are used on the rear axle, and two in the pinion housing. The front axle is an I section drop forging, with Elliott type steering heads, and with Timken roller bearings at the upper end of the pivot. The steering knuckle consists of drop forged and hand forged parts of nickel steel, the axle stubs being fitted with Timken roller bearings.

A new type of steering gear is used, of

the irreversible type, comprising a double screw motion with a rocker action at the base, which works the steering lever. lever and its shaft are of nickel steel. The spark and throttle levers are located on top of the 18 inch steering wheel. The brake drums secured to the rear wheels are pressed from one piece of sheet steel with an air space between the outer and inner rim to avoid any possibility of either brake dragging as a result of the expansion of the rim due to heat generated by the action of the other brake. The service brake is of the contracting band type; it acts on the outside of the outer rim and is pedal operated. The band is so fastened that it is freed of the rim, when not applied, by springs and a binder post. It can be adjusted by means of a very accessible turnbuckle. The emergency brake is applied by pulling back on a hand lever. It is of the expanding type, operates on the inner rim of the brake drum and can be easily adjusted. Both brakes are lined with Thermoid and are provided with equalizers.

The Knox Automobile Company make all of their vehicle bodies in their own factory. All open bodies are made of steel and aluminum, with a wooden base. They also make all their tops and their folding glass

The frames are made of cold pressed alloy steel, heat treated. Besides the bronze support which carries the trunnion at the front of the power plant, and the two rear points of support on the yoke, two pressed



SIDE ELEVATION OF KNOX MODEL R CHASSIS.



CHASE SURREY.

steel cross members are used. The frame has a 1½ inch drop at the rear and is inswept at the forward end to increase the steering lock. On the Model R 40 inch semi-elliptic front springs are used and 50 inch three-quarter scroll elliptic rear springs, with oil cups on all hangers and pins. All springs are of nickel steel. The wheels are 36 inches in diameter, and fitted with 4 inch Fisk bolted on tires on demountable rims. The car is stated to weigh 3,000 pounds with equipment.

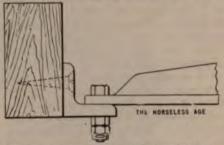
The Chase Surrey.

The Chase Motor Truck Company, of Syracuse, N. Y., have recently brought out a new design of car, a surrey which can be converted into a commercial runabout for the use of tradesmen, for light delivery, etc. The car is equipped with 40 inch wheels, fitted with 134 inch Firestone flat tread solid rubber tires It has a wheel base of 96 inches and weighs 1,400 pounds complete.

The motor is a three cylinder, two cycle vertical one, cooled by the Chase system of air cooling. A sectional view through one of the cylinders is shown herewith. It will be observed that the motor is of the three port type, with pre-compression in the crank case. The crank chamber is made of two iron castings bolted together in a horizontal plane through the centre of the crank shaft. The four main bearings of the crank shaft are exceptionally long and are bronze bushed. Counterweights are fitted to all of the crank arms, and the motor is thoroughly balanced.

The cylinders are of 41/8 inches bore and stroke respectively, and the motor is rated at 18 to 20 horse power. The arrangement of the ports is the same as in a conventional three port engine, except that the transfer passage is con tained entirely within the cylinder casting, and opens into the crank chamber through ports in the cylinder wall and the piston wall. This reduces the length of the passage, and should reduce the resistance encountered by the charge in passing from the crank chamber to the cylinder. The top of the piston is slanted downward from the upper edge of the deflector plate. Light drop forged connecting rods are used, and hollow wrist

pins. The cylinders are cast with annular flanges on their side walls and vertical flanges on the head. The flywheel is developed in the form of a centrifugal fan, resembling a paddle wheel in general appearance. The action of the flywheel is to draw air into the bonnet

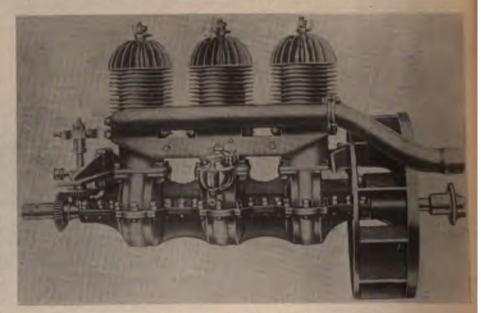


SECTIONAL SKETCH OF CHASE FRAME, (Not to scale.)

space, which is open in front, and over the cylinders, and to force it out around its circumference. A dustpan underneath the engine, conforming to the circumference of the flywheel, renders the air circulation more effective.

A Holley carburetor is used, and connects through a cast iron manifold with the crank case inlet ports of the three cylinders. Fuel is carried in a to gallon tank in the front seat, and is fed to the carburetor by gravity. The Atwater Kent unisparker is employed for ignition The make and break device is carried on a vertical shaft in front of the motor, and is driven by mitre gears from the crank shaft, and the coil is secured to the dash board. The current for ignition is furnished by a dry cell battery. Only a smgle set of cells is carried, which furnish current for 500 to 700 miles. The oiling system of the engine is exceedingly simple. There are no oilers or oil cups of any kind on the engine, except one grease cup on the timer shaft, all wearing parts being lubricated by oil mixed with the gasoline before it is poured into the tank However, each of the main crank shah bearings is provided with an oil tube for emergency lubrication by means of a squirt gun. These tubes are closed by spring pressed steel balls. It is the cutom to mix 1 quart of oil with every 5 gallons of gasoline. This lubricating system is said to have proven particularly satisfactory in connection with delivery wagons of small tradesmen, which are often operated by apprentices. It is impossible to either adjust the lubrication improperly or to entirely forget turning the oil on. The amount of lubricant used is in exact proportion to the work done by the engine, and there is therefore no possibility of excess lubrication, with its attendant sooting of plugs and foul ex-

Directly back of the engine is located a single universal joint, from which a driving shaft extends to the encased planetary change speed gear, which is built in one unit with the bevel gear and differential on the countershaft. The change gear gives two forward speeds and one reverse, and is of the conventional type with fibre disc high speed clutch and bronze low speed and reverse brakes. The countershaft is mounted in Hyatt roller bearings. The bevel gears

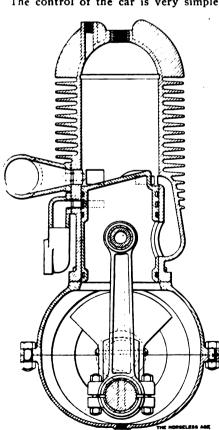


CHASE THREE CYLINDER, TWO CYCLE, AIR COOLED MOTOR.

on the countershaft give a reduction of 3 to 1, being cut with sixteen and forty eight teeth, respectively. From the countershaft the power is transmitted to the rear wheels by side chains running on sprockets of nineteen and forty-eight teeth, respectively. The countershaft bearings are held in the proper relation to the rear axle by means of adjustable distance rods. Both the front and rear axle are 13% inch square solid axles. The front axle is dropped in the centre. The car is carried on full elliptic springs in front and rear, which are clipped to the underside of the axle. The axles are of Sheldon make and equipped with Em pire ball bearings. The steering heads are of the Elliott type, and standard drop forged steering connections are used with ball and socket joints. The steering gear is of Barnes make.

For braking the car recourse may be had to the reverse gear, and in addition a set of Raymond brakes are fitted to the rear wheels. The brake drums are combined with the sprocket wheels, and are clamped to the wheel spokes by means of clips. The frame is of ash, the side members being sawed out to arch slightly upward, so as to prevent downward curving when the car is loaded. The ash sills are reinforced with angle iron members on the inside and flush with the lower edge, on which the mechanism of the car is supported. The engine is supported by means of two malleable iron cross beams, as shown in the side view of the engine.

The control of the car is very simple.



SECTION THROUGH CYLINDER.



CHASE DELIVERY WAGON USED BY NEW YORK CLOTHING HOUSE.

The steering post and hand wheel are located in the usual position on the right hand side. At the base of the post there are two pedals, the left hand one giving the low speed ahead, and the right hand one serving to apply the rear wheel brakes. The side lever gives the high forward and the reverse. The thumb levers for the spark and throttle are mounted on top of the steering columns.

#### The Lion Peugeot Two Cylinder Motor.

Recent tendencies in French motor design for small cars are well illustrated by the Lion Peugeot two cylinder motor, of 3 inch bore by 6 inch stroke. This motor has been designed to permit of being substituted for the single cylinder motors with which the company formerly fitted its light cars, as well as to be fitted to new runabouts. The two cylinders are arranged to make an angle of 20 degrees with each other. Both connecting rods act on the same crank pin. The motor has a built up crank shaft and enclosed flywheels. The long stroke necessitates flywheels of considerable size, and, in consequence, the crank case is of large diameter. One of the main engine journals carries at its outer end the male member of a conical friction clutch, and the other main journal carries the cam gear pinion. The cam shaft is opcrated through the intermediary of one set of bevel gears and one set of spur gears. The push rods are operated through the intermediary of bell cranks. The cam gearing is entirely enclosed so as to minimize the noise. The gear wheel keyed to the cam shaft meshes with a gear which drives the water and oil circulation pumps and the magneto. All of these parts are very accessible.

#### The Thomas 1910 Model "M."

The E. R. Thomas Motor Company, of Buffalo, N. Y., offer for the 1910 season a six cylinder, 40 horse power car, known as their Model M, which, with a very complete equipment, sells for \$3,500. The equipment includes a top, glass front, speedometer, horn, headlights, Prest-O-Lite tank, two oil side lights, a tail light and two complete ignition systems. The car is furnished with six different bodies, viz., touring car, runabout, tourabout, flyabout, landaulette and limousine. The bodies are of hand hammered aluminum and are luxuriously upholstered in leather and curled hair. The touring car seats five passengers. The car has a wheel base of 125 inches and standard tread.

The motor has a bore of 41/2 inches and a stroke of 51/2 inches, and is designated by the manufacturers as a long stroke motor. All of the valve ports and passages are exceedingly large and direct, the actual clear diameter of the passage carrying the gases to the cylinder being 21/8 inches, or one-half the cylinder bore. The valve measures 256 inches across the head. The valve seats and valve guides are completely water jacketed so as to allow of continuous running under load without local overheating.

The pistons are 51/2 inches long and are provided with four narrow rings. The connecting rod is 113/4 inches long, three-quarters of an inch longer than twice the stroke of the motor. The crank shaft is 17% inches in diameter, and has a total projected area of 52.6 square inches. The cam shaft also has a very liberal bearing surface, and the bearings are located very close to the cams. The total projected area of the bearings of each shaft is 11.3 square inches. All the bearings of the motor are plain, the crank shaft main bearings and crank pin



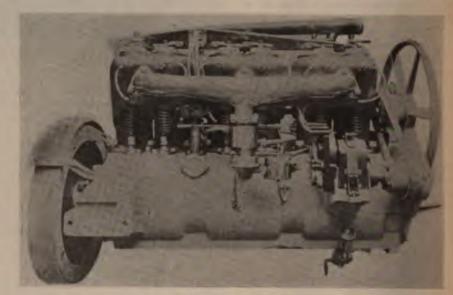
THOMAS MODEL M SIX CYLINDER, FORTY HORSE POWER TOURING CAR.

bearings being bushed with die cast babbitt bushings, which are easily renewed, since they are interchangeable. The cam shaft bearings are of bronze. The crank shaft is a carbon steel drop forging, heat treated. The connecting rods are of 3½ per cent. nickel steel. The cam shafts are also of nickel steel, as are the connecting rod bolts. The flywheel, instead of being an iron casting, as in the majority of cars, is cast of steel, and an accident due to racing of the motor is therefore impossible.

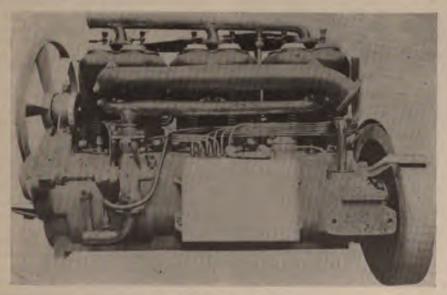
Particular effort has been made in designing the motor to insure quiet running. Thus, the cam gears are made of the herringbone type, of steel and phosphor bronze, respectively; the valve plungers have been provided with fibre inserts, and the clearance of the valve stem bearings has been reduced about 50 per cent. In order to insure absolute balance the pistons of all the cylinders are standardized in weight, all revolving parts are carefully balanced, and the compression spaces of all the cylinders are equalized.

The Thomas three disc clutch, used on former models, is retained on the Model M. The clutch disc is carried on two imported annular ball bearings, so a scarcity of lubricant will not cause dragging. Two universal joints of the internal gear type are inserted between the clutch and the change gear. It is stated that this type of universal joint has given entire satisfaction in service on motor trucks where all other forms of joints failed. The clutch is provided with cork inserts and has a double adjustment. By cranking the cross shaft of the clutch mechanism the clutch has been made much easier to operate. The change gear weighs complete only 82

The change gear weighs complete only & pounds, and is equipped throughout with imported annular bearings. It was designed to secure very short shafts, so as to be very rigid. The distance from centre to centre of the annular ball bearings on the countershaft is only & inches. Six annular bearings are used in the gear box. The gears



INLET SIDE OF MOTOR.



EXHAUST SIDE OF MOTOR

are nickel steel, case hardened, the case hardening process consisting in carbonizing in powdered bone, allowing to cool in the pot, reheating to between 1,375 and 1,425 degrees, and finally quenching in oil.

The rear axle is a Timken axle, with pressed steel casing and Timken roller bearings throughout. The bevel gears are of four pitch and give a speed reduction of 3 to 1. The company state that they tried out one of these axles on a heavy car of greater horse power without discovering any signs of weakness. The front axle, 25 well as the steering knuckles, are made of nickel steel. The springs are of alloy steel.

The ignition is effected by a Bosch DR-6 magneto, which furnishes current to one set of plugs, and an Atwater Kent unisparker, which supplies the second set of plugs. The engine piping is of drawn copper tubing, and is consequently quite light. Among the improved details on the new model may be mentioned the ball and

socket joints in the magneto and carburetor control mechanism, which is very closely adjustable. The wiring is carried in carefully designed housings. The fenders and running board apron absolutely protect the passengers against splashing mud.

## Eisemann High Tension Dual Igni-

tion System.
This system is designed to fill the demand for a magneto system which permits of starting the motor from the seat. It comprises a Type E K magneto, a non-vibrator dash coil combined with a high and low tension switch. The make and break mechanism and the high tension distributor serve for both the magneto and the coil, and the distributor is positively connected to the make and break mechanism, so that both are advanced or retarded in unison, and the distributor arm is therefore making contact with a segment at all times when the make and break contacts are in the firing position. This feature and the formation of the laminated armature core, which is of the

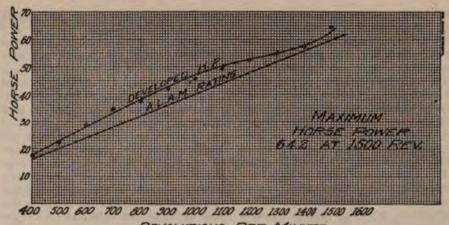


STARTING COIL.

modified H type, make the system particularly suitable for two cycle engines, because of the wide timing range of the magneto. The magnetic field is produced by two, three or four simple or double magnets, according to the size of the magneto. The pole pieces are of new design, the edges being cut along helicoidal lines instead of being straight. With this construction the armature is in touch with the pole pieces, or a greater portion of revolution than in former design, and the range of spark lag and lead will be greater on account of the more even field.

The armature is of the double T type. the central part being laminated. The primary winding is wound directly on the core of the armature, being insulated from the latter by several layers of high grade insulating silk, and the secondary winding is wound on the primary. One end of each winding is grounded, the other end from the primary is connected with the breaker, and that of the secondary with the slip ring or collector.

The starting coil includes a stationary induction coil with condenser for increas-



REVOLUTIONS PER MINUTE Horse Power Curve of Thomas Six-Forty Motor.

ing the voltage of the battery current and the switch which carries the high and the low tension currents at the same time. This switch is constructed of copper segments inserted in thick hard rubber, and is claimed to be perfectly proof against leaking and wearing.

#### The Palmer-Moore Low-High Speed Two Cycle Motor.

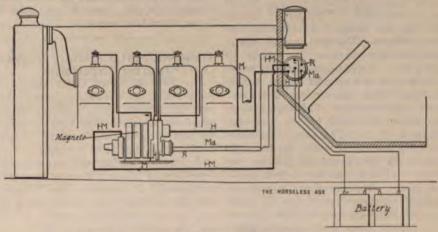
The Palmer-Moore Company, of Syracuse, N. Y., who have recently removed from 315 East Washington street to corner Tallman and Oneida streets, have had a patent allowed them on a new design of two cycle motor which they intend to develop for automobile purposes. The company have been manufacturing two cycle motors for marine work for a number of years, and the new motor is a development of their marine motor, the recent improvements enabling it to run at high speed and to develop proportionately more power.

A feature of the Palmer-Moore marine motor, and also of the new motor, is that the combustible charge is not compressed in the crank case, as in the majority of two cycle motors, but in a closed chamber underneath the piston. In the lower portion of the cylinder there is a smaller cylinder which acts as a crosshead guide. The working piston is connected to a piston rod which extends through a stuffing box in the head of the crosshead guide, and is fastened into a crosshead at its lower end.

This enables the company to get any desired amount of precompression. In the engines so far made the precompression is carried at 12 pounds per square inch. The marine motors are of the open base type, the cylinders being carried on four steel columns, as shown in the accompanying sectional sketch. The automobile motors are to be of similar construction, except that side plates will be provided for enclosing the

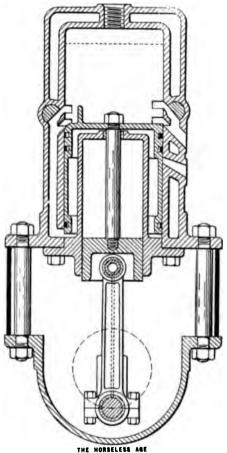
The engines are made in both a two port and a three port type. The novel feature of design above referred to consists in the provision of double transfer and exhaust ports. The two sets of ports are located one above the other, and are of the same width. The lower ports are of the same size and similarly located as those used in the slow speed marine motors, and when the engine is being operated at slow speed only these ports are effective, the upper ports being then closed by means of simple rotary valves.

The various valves are all connected together, and are held closed by means of a single spring and opened by means of a foot button. The valves consist of cold rolled steel pins of about I inch diameter placed in holes drilled into the cylinder castings, one side of the pins being flattened opposite the ports. The theory of the design is as follows: In order to enable a two cycle motor to run at high speed the ports must be much wider than they are



WIRING DIAGRAM OF EISEMANN DUAL IGNITION SYSTEM.

usually made on low speed, two cycle motors. At low speed, however, these wide ports are objectionable, because not only is the pressure in the cylinder during the down stroke of the piston relieved long before the piston reaches the end of its downward stroke, and thus power lost, but since the transfer port and exhaust port are open simultaneously for a much longer time than is necessary a considerable portion of the new charge is likely to leak out through the exhaust port before it closes. In fact, tests made with the object of determining the best port dimensions for high speed, two cycle engines have shown that increasing the port sizes usually increases the maximum power output, but it is not advisable to go beyond a certain point, be-



Section of Palmer-Moore Motor.

cause the fuel efficiency decreases as the power increases. Moreover, a high speed engine will not work at very low speed.

The Palmer-Moore Company are at present showing a two cylinder motor of 51/4 inch bore by 41/4 inch stroke, which they rate at 10 horse power. This engine, they state, will operate under load at from 200 to 1,300 r. p. m. They are at present using a mechanical lubricator, but later on expect to mix the oil with the gasoline for cylinder lubrication, and use oil bath lubrication in the crank chamber. As there is practically no possibility of the oil from the crank chamber getting into the cylinder in this type of motor, a very large amount of oil can be put into the crank chamber.

## New Factory for Frank Mossberg Company.

A \$50,000 factory is being erected for the Frank Mossberg Company, Attleboro, Mass., near the New York, New Haven & Hartford Railroad, a quarter mile south from the centre of the city. The building is erected with funds subscribed by local business men, and will become the property of the Frank Mossberg Company at the end of eight years, provided certain requirements are lived up to. It is to be completed by December 1. In addition to the main building, which is to be a brick structure 290x60 feet and two stories high, a power plant will be erected. The main floor of the main building will be used for the presses and heavy machinery, while the second floor will be used for light manufacturing, tool making, etc.

## Jewel Motor Car Company Reorganized.

A complete reorganization of the Jewel Motor Car Company, of Massillon, Ohio, has been effected by H. A. Croxton and J. M. Keeton. The name of the concern has been changed to the Croxton-Keeton Motor Company, and the capitalization increased from \$250,000 to \$500,000. H. A. Croxton, the new president, is a leading spirit in the iron and steel business in Massillon, and J. M. Keeton was formerly connected with the Pope-Toledo and De Luxe concerns. Plans are under way for a large addition to the plant, and an option on 7 acres of additional ground has been taken. The capacity of the plant has been doubled. Distributing agencies have been opened at New York, Cleveland, Pittsburg and Boston.

## Women Complete Transcontinental Trip.

Mrs. John R. Ramsey, of Hackensack, N. J., and associates, who started from New York a little over a month ago on a transcontinental trip in a Maxwell touring car, arrived in San Francisco on August 6, after being thirty-five days en route. The Maxwell-Briscoe Motor Car Company state that this is the first transcontinental trip made in a motor car by a woman. Mrs. Ramsey was accompanied by Mrs. N. R. Powell, Mrs. W. Edward and Miss H. Jahns, all of Hackensack, N. J.

Transcontinental Military Dispatch Bearing Experiment.

The Mitchell Motor Car Company, of Racine, Wis., last week shipped one of their new six cylinder, seven pasenger touring cars, 1910 model, to New York for use in the first transcontinental military dispatch bearing expedition ever attempted in the United States. The car will bear dispatches from General Leonard Wood at New York to General J. F. Weston at San Francisco. The car will carry five regular army officers and tents and camping outfits. A rapid fire rifle will be mounted on a special platform in front of the driver.

## Seismograph for Registering Motor Car Jolts.

At a recent soirée of the London Royal Society the Hon. R. C. Parsons exhibited a seismograph arranged to register the jolts of an automobile. The apparatus consists of a weight carried by the horizontal arm of a belt crank lever, the other arm of which is connected to a link holding a pencil against a paper covered revolving drum. Jolts displace vertically the point of suspension of the bell crank lever, giving an angular movement that is recorded by a horizontal motion of the pencil on the paper of the drum. The record gives an indication of the movements of the car body by obstacles or depressions in the road.

Hammondsport, N. Y., Motorcycle Concern Reorganized.

The Marvel Motorcycle Company has been organized at Hammondsport, N. Y., and has taken over the motorcycle business of the Motorcycle Equipment and Supply Company, which has been conducted by C. L. Waters for some years. Mr. Waters will be general maanger and C. P. Rudd superintendent. A building site has been bought and work will be immediately begun on a two story concrete block building 115x30 feet, which will be ready for occupancy by October 1. The company is incorporated with a capital stock of \$50,000.

Gary Company Absorbs Multi-Unit Engine Company.

The Gary Motor Car Company, of Muskegon, Mich., have taken over the factories, machinery and assets of the Multi-Unit Gas Engine Company, of Chicago. The Multi-Unit Company operated two factories, at Sheboygan Falls, Wis., and Connersville, Ind., respectively. The Multi-Unit engine will be used on the Gary vehicles. The officers of both companies are the same, and the transfer was made in consideration of an exchange of stock. It is said that the two plants will eventually be removed to Muskegon.

Separate Franklin Commercial Department.

The H. H. Franklin Manufacturing Company, Syracuse, N. Y., have established a special department for the manufacture of commercial cars. Herbert Hess is manager of this department, and W. F. Kneip is in charge of the engineering staff. A special building about a block away from the main factory of the company has recently been leased to house the commercial vehicle department and part of the sales department of the company.

Simplex Motor Car Company to Double Its Factory Capacity.

The Simplex Motor Car Company, of Mishawaka, Ind., are receiving bids on a single story brick building 72x240 feet, a duplicate of their present building. The contract will be let immediately.

#### COMMUNICATIONS



## Feeding Gasoline from Gravity Tanks on Steep Hills.

Editor Horseless Age:

I live among the foothills of the Adirondacks. It is a region where if you travel you must go either up hill or down. A motor car is never on the level save when on the bridge that spans the brook between the hills. I own and navigate the "most popular runabout." The fuel tank holds 8 gallons. It is never safe to go out with less than 5, and even then it is prudent to keep within sound of the dinner horn, for the frequent sharp, steep hills will leave your carburetor as dry as Sir Walter Scott's Reverend Doctor Dryasdust. Result: A halt as abrupt as a bucking broncho's, a jamming on of the "emergency," a blocking of front or rear wheels-both of them-a release of the low gear to see if the "most popular" will stand for cranking, a tickling of the inlet valve and getting no response, and, finally, a picturesque objurgation of the man who can make a car, sell it to the unsuspecting with a warrant that it carries fuel enough to take him 200 miles when in fact it will hang him up on the first steep pitch if his gasoline gets 3 gallons below the tank capacity.

For every ill there is a remedy. Having laid the foundation, let me apply it.

The screw cap to the tank has an ample flange. Fit a leather gasket under it and the tank becomes airtight under a low pressure. Drill and tap this cap for a one-eighth inch pipe plug. Drill a one-sixteenth inch vent hole through this plug. Take another plug, drill it so a common Schrader air valve will just wedge in snugly. Apply a little shellac varnish to the stem of this air valve to make it tight. I like this better than using a brass plug and soldering in the valve, for if the plug after it with a screwdriver, without jamming the valve case.

Now go out with your 5 gallons fear-lessly. Your vent plug is in place in the tank cap and your valve plug in your vest pocket. Get hung up on the first pitch and enjoy a sense of triumph as you search the surrounding country for a fence rail or two good sized stones to block your wheels with. Remove the vent plug from the cap, put the valve plug in its place. Serew on your air pump and three strokes will send the gasoline forward with a rush. Be gentle now; not too much pressure or you will flood things. Get in and ride to the top in ecstasy.

The only reason for a separate plug for the air valve is that the gasoline fumes will eat away the little rubber packing so it will not hold the pressure. Thus endeth the first lesson.

In 1851 a cute Yankee, Francis by name,

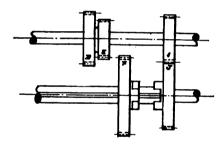
went over to the Crystal Palace Exhibition in London and showed the astute Britisher how to make a self baling lifeboat. The rocking of the boat raised the water inside of it and discharged it. Any motor car at speed rocks like a dory in a tempest. Is it beyond the capacity of the motor maker to make a tank that will elevate its contents so the final drop can be used? A word to the wise is sufficient. A word to the don'tcare-a-Vanderbilt for the man who gets hung up and is forced to carry 8 gallons when he can utilize but 5 (prairie countries excepted) is lost upon him. Let him alone. "His eyes is sot," as Governor Hoard used to say of the dying family horse. But the lifeboat man will come along, by and by, and his gasoline tank will have its contents where the gray matter of all manufacturers should be-in the upper story.

J. S. CORBIN.

#### Pressure on Gear Teeth.

Editor Horseless Age:

In your Engineering Number of November 7, 1906, on page 595, is an article on "The Factor of Safety in Transmission Gears," by Professor Rautenstraugh. In the first case considered (see Fig. 1), he assumes the torque of the shaft to be 2,000



inch pounds. From the formula given in "Machine Design," by Professor Unwin, page 214, viz., T=P. R. = 63,024  $\frac{H \cdot P \cdot}{N}$ , if we assume the revolutions per minute at 1,000, we find the horse power to be 31.7, or, say, 32.

Again, on page 328 of Unwin is this

formula for computing the tooth pressures, viz.,  $P = 63.020 = \frac{H.\ P.}{R.\ N.}$ . Where R = radius of gear in inches, N = revolutions per minute. This formula when applied to the two gears I and J gives for P = 781.5, which agrees fairly well with the professor. If you will kindly enlighten me how he gets P = 1,000, for gears E and F (see enclosed sketch), you will do me a great favor.

T. O.

[It is the squared shaft which transmits a torque of 2,000 pounds-inches, that is, a force or pressure of 2,000 pounds at a radius of 1 inch. The pinion A has a pitch radius of 1½ inches, and at this radius the pressure is evidently 2,000 + 1½ = 1,600, which agrees with the article. The pinion C has a pitch radius of 2.083 inches, and the pitch line pressure is therefore

2,000 + 2.083 = 960 pounds. The article gives the pressure as 1,000 pounds. The pinion F has a pitch radius of 2.25 inches, and the pitch line pressure would therefore be

2.000 + 2.25 = 888 pounds.

The article gives 1,000 pounds. It would seem that Professor Rautenstraugh had taken round figures all through, as all the loads on teeth are given in full hundreds of pounds; but the load on the teeth of gears E and F should have been 900 pounds, it would seem, instead of 1,000 pounds.

—ED.]

## Acceptance of Car for Bail. Editor Horseless Age:

If I am arrested for speeding, because my lights are out or my license is gone, do the police have to take the car as bail if I offer it? Cannot I 'phone a friend for bail? If the man driving the car goes with the officer, can the car be held? I mean should the police allow the above under the present law, not would they do it?

H. H. W.

[The New York State law is very definite in regard to the first question. Sub-division 3 of the law reads as follows: "Release from Custody, Bail, etc.-In case the owner of a motor vehicle shall be taken into custody because of a violation of any provision of this act, he shall be forthwith taken before an accessible captain or a sergeant or acting sergeant of police in any city or village, or any justice of the peace or magistrate, and be entitled to an immediate hearing; and if such hearing cannot then be had, be released from custody on giving a bond or undertaking executed by a fidelity or surety company organized under the laws of this State and having a deposit of at least \$200,000 with the Superintendent of Insurance of this State, said bond or undertaking to be in an amount not exceeding the maximum fine for the offense with which the owner is charged, and to be conditioned for the owner's appearance in answer for such violation at such time and place as shall then be indicated; or on giving his personal undertaking to appear in answer for such violation, at such time and place as shall then be indicated, secured by the deposit of a sum equal to the maximum fine for the offense with which he is charged, or in lieu thereof, by leaving the motor vehicle, being operated by such person, with such officer; or in case such officer is not accessible, be forthwith released from custody on giving his name and address to the officer making such arrest, and depositing with such officer a sum equal to the maximum fine for the offense for which such arrest is made, or in lieu thereof, by leaving the motor vehicle, being operated by such person, with such officer; provided, that in such case the officer making such arrest shall give a receipt in writing for such sum or vehicle, and notify such person to appear before the most accessible magistrate, naming him, on that or the following day, specifying the place and hour."

The automobile law thus provides that you

can either file a bail bond, put up cash bail, or leave your car as bail, and it would seem that everyone arrested should be able to furnish at least one of these different kinds of bail. The automobile law does not say anything about telephoning for bail. This is a matter that would come under the rules of the police department. It is the driver who is held for an offense, and if he accompanies the officer the car cannot be held.—ED.]

## Relative Balance of Different Engine Types.

Editor Horseless Age:

Will you kindly give, if possible, in the appropriate department of your valuable paper, the method of determining the relatively perfect balancing of vertical, horizontal and V type cylindered engines from one to six cylinders of each type? H. R. S.

[If we understand you correctly you want figures expressing the relative perfection of balance of the different types of engines. For instance, if the balance of the six cylinder type was put down at 100, that of the four cylinder type might be 75, or some such figure. We do not believe that it is possible to give such figures. We can, however, arrange the different engine types in the order of perfection of balance, as follows: 1, Two cylinder 90 degrees V, four cylinder opposed horizontal and six cylinder vertical, all perfectly balanced; 2, two cylinder opposed; 3, four cylinder vertical; 4. three cylinder vertical; 5, two cylinder vertical; 6, single cylinder vertical. This comparison is based on equal cylinder dimensions and not on engines of equal powers.—Ep.1

## Defective Piston Pin Design. Editor Horseless Age:

In your issue of July 21 is a scheme for fixing piston pins. I came across it in my scrap book last winter about the time I was doing over one of my cars, a 18-23 Mercedes, 1904. This car has to be done over every year, and the pistons had been drilled and tapped four times, necessitated in previous years by the Mercedes system

of fastening piston pins, with which you are probably acquainted.

Anyway, I suggested the idea to my mechanic, and we decided for the idea mentioned. I drew very carefully to full size the pistons and worked out the design to our needs, a photo of which design I enclose. This work was most beautifully done; you may take my word for this, as we have only high grade machines and tools.

The work finished, my machinist and I left my home at Nice and drove here (Les Sables d'Olonne), where we spend our summers. After about 1,500 kilometers a knock developed; we thought naturally the bronzes had gone. The cylinders were slipped off and we found that all four pins had broken at the taper pin hole, the cylinders were scored badly, and from the looks of the breaks we suppose the pins had broken the first day the motor was run. It was only good fitting that had held the pistons and connecting rods together.

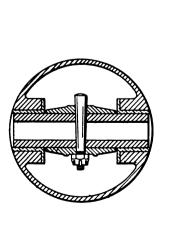
This experience of mine may not interest you at all; but if by chance it should, and you have any suggestion to make as to the possible cause of failure, I would be glad to have it. The steel used, while the best I could buy at Nice in a hurry, was not best quality cast steel. My stock of Sheffield steel was undersized. In the circular section of the piston pin you will see that I gave a taper of roughly 1 mm. in 36, this taper being the standard taper of taper pin reamers in France. As I say, it is only approximate. Maybe the taper pin was too big for this size piston pin. Maybe the cone or taper was too fine, and consequently "brutal." Maybe it was only the poor quality steel. Maybe only the bearing ends of the piston pin should have been hardened, leaving the taper pin hole annealed. W. H. B.

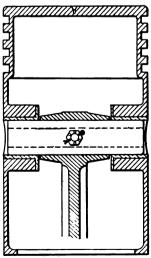
[It is really not surprising that the pins broke if they were of hardened steel. The hole for the pin in the centre will localize the bending strains at that point, and unless the pins were very large, as compared with the usual practice, they might be expected to snap off under the force of the explosion, the same as Mushet steel snaps off when notched on a grinder, clamped in a vise and dealt a light blow with a hammer. To remedy the defect we would suggest to bore out only the ends of the pin, leaving the central portion where the hole for the taper pin comes solid, and confine the hardening of the pin to the end bearing portions.—Ep.]

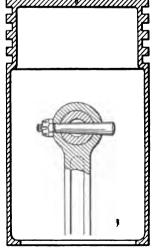
## Manufactured versus Assembled Cars.

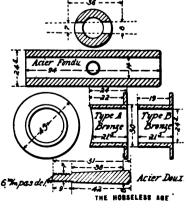
Editor Horseless Age:

For obvious reasons the question, or rather subject, of "manufactured" and "assembled" cars is of interest to the owners and prospective purchasers of motor cars. Technically speaking, every car is an assembled car; but what is of importance is whether the parts are fitted or merely "thrown together," as shabby work is termed in machine shop parlance. Aside from the question of suitable material. which is now selected from what past experience has proven best, and on which there are very reliable data as to method and ease of machining, as well as subsequent wearing qualities, care and discretion in treating, fitting and assembling, are the only guarantee against chronic trouble and satisfactory operation during the life of the car, provided the design is mechanically right and does not embody new and untried experiments. Simplicity of construction is also very desirable, and parts should be few in number and readily accessible. The demands made on a car are usually very severe, and running conditions often unfavorable, and this makes it all the more imperative that the small light weight parts should be correctly adjusted. While careful machining to the limits called for on drawings does not eliminate the work of the assembler nor constitute any excuse for carelessness on his part, it minimizes his work and makes for greater interchangeability in case of repairs. As the automobile is made up of so many different parts very few manufacturers possess sufficient space and equipment to do all the required machining, and are thus obliged to buy from









Working Drawing of Piston Pin and Piston.

others, made to their orders, parts which cannot be bought in the open market as standard material. Such parts are cast, drop forged, punched, bent and machined to blue print and pass a rigid inspection before being sent to the stock rooms. Complicated pieces which are hard to machine and must be perfect are more often let to part makers than pieces of less difficult shape, that can be readily finished on standard machines. When this is the case the jig and special tools used are the property of the manufacturer, which places him in position to furnish satisfactory repairs. Where these pieces are made from castings the patterns are, unless universally standard, the property of the manufacturer. The dies used in the making of drop forgings are owned by the drop forge men, but subject to the wishes of the manufacturers, so that repairs are available, even if such forgings are discarded on later models. The manufacturer (and there are many of him) who buys his parts, as outlined above, has the choice of his material; it is made up to his specifications, inspected and assembled at his own factory, and there can be no reason why a car so made is not the equal of any other car "built entirely in our own works," if his inspectors are up to the job and he is not pressed to use culls. As the use of parts not accurately machined means a loss to him in additional assembling expense, such defective parts are usually rejected, the parts maker standing the loss, which might not be so if the parts were machined in the manufacturer's own shon.

The manufacturer who buys all or some of his units, such as engines, transmissions, axles and clutches, relies almost entirely upon the honesty of the parts makers and the thoroughness of his final inspection, unless he tears down and reassembles. This adds to his assembling cost, but he has a direct knowledge of how workmanlike the parts have been assembled. It may also explain why two such manufacturers, using virtually the same units, have different selling prices, and that the higher priced one is able to guarantee his product while the other does not. It certainly is of interest to the manufacturer, as of subsequent benefit to the user, to have the advantage of more than a superficial inspection, and it may be well to remember that a finely finished exterior does not compensate for concealed defects. A piston not properly fitted to the cylinder means a knock, leaky piston rings, less efficiency, imperfectly seated valves. A crank shaft that is not perfectly balanced with its piston and connecting rod parts may eventually wreck the engine. Parallel shafts should run in true alignment; gears should run in mesh, neither binding nor running loose at different spots, which tends toward noise and excessive wear; the bearings should run free and allow for proper lubrication.

Water jacketed cylinders should be free from porous spots and cracks, and be thoroughly tested for sufficient periods of time. Engine bases, transmission cases, rear axle housings and other parts that contain oil should be well fitted and free from unsound spots to prevent leakage.

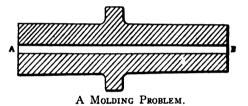
To sum up, a car that is well designed, made up of good, serviceable material, devoid of intricate mechanisms and attachments, which are usually trouble breeders, should give good satisfaction on the road, no matter where or by whom the parts have been machined, so long as the assembler's work has been well done, for it stands to reason that he is last and final in the long line of responsibilities involved in the manufacture of automobiles.

H. G. SCHWOEPPE.

#### A Molding Problem.

Editor Horseless Age:

I am experimenting with a substance intended as a substitute for the porcelain or mica cores of spark plugs. The composition is melted and poured into molds, but the difficulty is that it sticks to the plunger of the mold. The form I am trying to get is that used in the old Knox models and trucks (see enclosed sketch). A B is a



circular opening of about three-sixteenths of an inch diameter running through the length of the core. Can you aid me?

J. S. M.

[If the composition sticks quite fast to the core why not use the central pin or terminal of the spark plug for a core and make the central terminal and insulator in one? If this is impracticable for any reason, some form of destructible core must be used as in foundry work, but we do not know of any substance suitable for the purpose.—Ed.]

#### Comfortable Seats.

Editor Horseless Age:

It pleases me to see that somebody has started a discussion of so necessary a feature as the seats of the auto. Appearance rather than comfort has seemed to be the guide for building these in the past. I have been so placed for years that the output was limited, so I have not had any need to build to sell, and therefore have spent much time on features such as the securing of comfortable seats. High and low, long and short, with back vertical and much inclined, have been tried, not once but repeatedly. My conclusions, based on the verdicts of the users of these various seats in rigs practically alike as well as on use of them myself, is in favor of deep springs, a fairly level cushion and a back that is nearly vertical. This back should be so low that a rider can rest an arm on it when desired. Having deep springs, one can recline against the back with no fear of getting against hard supports; and the rig can rock over the water bars and gutters without transferring the motion to the rider. Further, the low back does not support the shoulder blades, but leaves the upper part of the spinal column free to follow the tossing of the vehicle. This is much more comfortable on the average American rough road than a back so high as to support the shoulders, because in that case the tossing must be taken by the neck, with the result that one's head is nearly jerked off at every water bar. I have known a woman to ride 60 miles in a popular touring car and then have to take to her bed for several days because of the intense pain in the back of the neck due to these jerks. And the shape of the touring car has been bad, because springs could not readily be fitted to the upholstering. The backs of many tonneau seats have very little more elasticity than a carpeted board. The inclined back and raised front cushion are splendid sellers. The buyer and his wife feel so cosy and comfortable when they drop into such a seat. But the first hard jolt tells another story. Mankind's internal mechanism is not rigidly anchored fore and aft. It will stand hard jolts in a direction parallel to the spinal column, but not crosswise thereto. The rider who can sit up and ride all day finds discomfort in a short while if partly reclining and jolted. At each jolt he unconsciously tries to resist, and this is tiresome. But I have found it impossible to make the buyer believe those things. He likes the riding of the rig, but wishes it was built so it looked like some of those big touring cars with hard upholstering as high as the shoulders and then turned over backward to make a good rest for his head. Buggy builders used to make comfortable backs, but since the auto set the style it is my opinion that there has been a decided loss in comfort. Lots of folks buy green fruit unfit to eat because it looks nice, and the auto buyer is no CHAS. E. DURYEA. exception.

## Loosening Refractory Nuts. Editor Horseless Age:

Will you kindly inform one of your readers whether in starting to unscrew a nut or bolt which is difficult to start there is any real or fancied advantage in turning it at first a slight amount in the wrong direction; that is, the direction which would tend to tighten it still more? Having seen several men doing this, I once asked one why he did it, supposing that he was momentarily confused as to the proper direction to turn the nut, and I was informed that it made the nut easier to remove. Not seeing the logic of this method, I have never cared to try it with a nut which was really difficult to remove, and I would like to ask you for information on this point.

W. S. D.

[Turning the nut the wrong way will certainly not help to loosen it if it is held only by mechanical pressure and not rusted in place, and would simply make it tighter.

However, if the nut is rusted, it is quite possible that turning it the wrong way will help to loosen it, as the reversal of the strain will help to break down the rust. Strains alternating in direction are very much harder on machine parts than strains always in the same direction, and the same should apply to the rust.-ED.]

#### Piston Pin Fastening.

Editor Horseless Age:

In a recent issue you mentioned a new method of fastening piston pins. The Crest people at one time used a design like that given below. The piston is slit for the cotter pin. I have used one of these mo tors as a stationary power plant for several years, and the above method works excellently.

[If we understand your sketch correctly, both the small pin and the split pin are lodged in slits or grooves on the outside of the piston. This method of retaining the pin is new to us and seems to be simple and dependable.-Ep.]

#### The Relative Seriousness of Ignition Trouble.

Editor Horseless Age:

On looking over your issue of August 11 we note your publication of a letter from the Maxwell-Briscoe Motor Company regarding the Glidden Tour. In one of the paragraphs of this communication it is stated that "ignition trouble is one of the most serious difficulties to the average automobilist, and one which is the cause of more stoppages than any other one thing," This statement is hardly fair, since it has been our experience that an automobile equipped with a first class magneto has no serious trouble whatever caused by ignition, and in the present almost universal use of the magneto the lack of attention it requires has led to complete forgetfulness of the ignition by the motorist.

In support of these statements it might be well to call the attention of your readers to the fact that of thirty starters in the Glidden Tour twenty-seven used magnetos. Of this number twenty-one were equipped with the Bosch, and we are happy to state that the tourists using this instrument went through the long grind without once touching the magneto for any adjustment or repair. We think that this is pretty good evidence that magneto ignition is the only practical system of perfect firing for internal combustion engines.

> BOSCH MAGNETO COMPANY, Otto Heins, Vice President.

Arthur E. Adams, manager of the Algonquin Motor Car Company, Boston, Mass., died at the Boothby Hospital, Boston, on August 12, at the age of twentyeight. Mr. Adams entered the automobile business as a salesman for the Pope Manufacturing Company, and was connected with one or two other Boston agencies before he became manager of the Algonquin Company.

Col. Albert A. Pope. Col. Albert A. Pope, whose death we chronicled in our last issue, was one of the most prominent figures in the automobile industry, having been president of the Pope Manufacturing Company and an active member of various trade organizations. He was born in Boston, Mass., on May 20, 1843, and was therefore in his sixty-seventh year at the time of his death. In his boyhood he worked on farms and in factories. and he was a typical self made man. The Pope Manufacturing Company was organized by him in 1877 for marketing small patented articles. In 1878 the manufacture of bicycles was begun, in which line of industry the company became very prominent. Colonel Pope took great interest in the good roads movement, and also founded a



COL. A. A. POPE.

cycling publication, The Wheelman, which is still in existence under another name.

After the collapse of the bicycle boom Colonel Pope turned his attention to automobiles. A portion of the Pope Manufacturing Company factory in Hartford was devoted to the manufacture of electric vehicles as early as 1897. In 1902 the subsidiary Pope Motor Car Company, after having built a few two cylinder and three cylinder cars, turned out a four cylinder machine which was classed among the leading makes in this country. same company produced electric vehicles in a plant in Indianapolis. The Pope Manufacturing Company, at its Hartford plant, began the manufacture of single cylinder gasoline cars, known as the Pope-Hartford, in 1904. Later a double cylinder opposed car was produced there, and finally a four cylinder, vertical, shaft driven car, which is still being turned out under the Pope name. In Hagerstown, Md., the company produced low priced single and double cylinder cars. At one time in their history the Pope companies manu-

factured automobiles of the single, double and four cylinder gasoline types, varying widely in price, and electric vehicles in considerable variety.

During the summer of 1907 the Pope Manufacturing Company, under the stress of the approaching financial panic, went into receiver's hands, one of Colonel Pope's sons being appointed co-receiver. During the receivership period several of the company's plants were disposed of, including the Waverley electric vehicle plant in Indianapolis, the Toledo, Ohio, plant and the Hagerstown, Md., plant. The receivers were enabled, with the receipts from these sales, to pay the indebtedness of the company in full, and they were discharged some time ago.

Colonel Pope had been in ill health since the failure of the bicycle industry, some ten years ago. Since July 9 last his condition was serious and his death was not unexpected.

Continental Motor Manufacturing Company Increases Capital Stock.

The Continental Motor Manufacturing Company, Muskegon, Mich., has increased its capital stock from \$250,000 to \$500,000. Of the total amount \$475,000 is common stock and \$25,000 preferred stock, earning 6 per cent, dividend and subject to redemption September 1, 1911. Of the new issue \$34,500 was subscribed for and apportioned pro rata among the old stockholders at a recent meeting, and the remainder is subject to action of the stockholders.

#### Auto Activity Booms Flint, Mich., Real Estate.

Reports from Flint, Mich., show conditions which are most unusual for any established city. It seems that the automobile business there has grown so rapidly that a great many workmen have collected from other cities. They have come in such numbers that houses have not been built fast enough to accommodate them, and many are living in tents. A probable reason for the failure to build houses is that the prices now asked for Flint real estate, both city and suburban, are so high that most builders consider them prohibitive.

#### Foreign Trade Opportunity.

There is a growing market for motor cars in a state in the Far East, according to an American consul there. He forwards a report on the subject, and appends a list of names of persons with whom American manufacturers of motor cars would do well to communicate. A copy of the report and list of names may be had by interested firms upon application to the Bureau of Manufactures. Refer to No. 375).

#### Business Trouble.

Walter H. Mitchell, doing business at the Hillman Auto Supply Manufacturing Company, 485 Tremont street, Boston, Mass., has made an assignment to Francis Hurturbis, Jr., and Chas. M. Shenton.

#### ommercial Applications.



#### A New Farm Tractor.

Gas Tractor Company, of Minneapon, which is said to have sold a cone number of motor farm tractors in Nebraska and Oklahoma, is seekcation near the centre of the source and for its product. Kansas City, naha, Neb., and Wichita, Kan., are onsidered. M. L. Lang, a repree of the company, said to a Horse-GE representative in Kansas City company intended not merely to the tractors at the new plant arts manufactured in Minneapolis, completely manufacture them there. City, he said, was looked upon y by the concern, owing to its geo-I location and fine shipping facilialso because it is already a dispoint for farm machinery on a

of the company's tractors is being by J. A. Kyle, who lives near Kan. He farmed 1,000 acres last When the Glidden tourists passed le's place the tractor was pulling disc plows behind, to which was ata heavy surface packer weighing ounds, which rolls and packs the n tightly to prevent the rapid evapof the moisture. The ground was mmediately after the harvest, and nain in that condition and take up fall until September 20, after which be seeded in in wheat. The tractor to turn and pack 30 acres a day, gallon and a half of gasoline per d I gallon of lubricating oil to acres. Two men usually work on or, though it is said that one could t. A self guiding wheel follows ow ahead of the big driving wheels, once set the tractor will go clear he field without attention, or if n a circle will continue its work



GAS TRACTION COMPANY'S FARM TRACTOR,

as long as the gasoline holds out and nothing goes wrong. The propelling power is furnished by a four cylinder, 90 horse power motor.

Milwaukee Fire Chief on Motor Fire Engines.

Chief Thomas A, Clancy of the Milwaukee (Wis.) fire department, speaking before the annual convention of the Wisconsin Paid Firemen's Association at Madison, gave marked approval to motor fire apparatus. Although he did not advise the purchase of self propelled vehicles for all purposes, he urged strongly the use of the motor car by chiefs and assistant chiefs in getting to fires. He gave interesting figures based on his experience with a touring car, a municipal car. In the two years he has had the car Chief Clancy responded to more than 600 alarms. The cost of gasoline has averaged \$10 a month; oils, \$25 a year. In twenty-two months the car consumed 1,200 gallons of gasoline. The third set of tires is now being used. He said he believed

motor apparatus is of greater advantage in smaller cities, where there is no traffic congestion, and where the distances are shorter. Mr. Clancy expressed the belief that heavy motor apparatus has not yet reached the point of perfection required. His car, however, is a great saving and highly satisfactory in every way.

#### Commercial Notes.

It is reported that W. H. Delany, of the Hotel Imperial, New York city, will import 500 Napier taxicabs.

C. H. Edwards, W. A. Day and C. S. Wilson, of Trinity, Cal., have established a motor stage line between Redding, Shasta County, and Weverville, Trinity County, with a seven passenger, 70 horse power touring car.

The West Philadelphia section of the United Gas Improvement Company has recently been equipped with five electric trucks, three for the meter inspection department and two for carrying piping. All of them are of General Vehicle Company



OVERLAND MOTOR MAIL WAGONS AT INDIANAPOLIS POST OFFICE.

(This service has been referred to in a recent issue.)



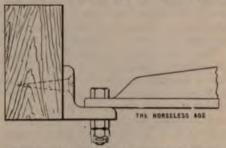
steel cross members are used. The frame has a 1½ inch drop at the rear and is inswept at the forward end to increase the steering lock. On the Model R 40 inch semi-elliptic front springs are used and 50 inch three-quarter scroll elliptic rear springs, with oil cups on all hangers and pins. All springs are of nickel steel. The wheels are 36 inches in diameter, and fitted with 4 inch Fisk bolted on tires on demountable rims. The car is stated to weigh 3,000 pounds with equipment.

The Chase Surrey.

The Chase Motor Truck Company, of Syracuse, N. Y., have recently brought out a new design of car, a surrey which can be converted into a commercial runabout for the use of tradesmen, for light delivery, etc. The car is equipped with 40 inch wheels, fitted with 134 inch Firestone flat tread solid rubber tires It has a wheel base of 96 inches and weighs 1,400 pounds complete.

The motor is a three cylinder, two cycle vertical one, cooled by the Chase system of air cooling. A sectional view through one of the cylinders is shown herewith. It will be observed that the motor is of the three port type, with pre-compression in the crank case. The crank chamber is made of two iron castings bolted together in a horizontal plane through the centre of the crank shaft. The four main bearings of the crank shaft are exceptionally long and are bronze bushed. Counterweights are fitted to all of the crank arms, and the motor is thoroughly balanced.

The cylinders are of 41/8 inches bore and stroke respectively, and the motor is rated at 18 to 20 horse power. The arrangement of the ports is the same as in a conventional three port engine, except that the transfer passage is con tained entirely within the cylinder casting, and opens into the crank chamber through ports in the cylinder wall and the piston wall. This reduces the length of the passage, and should reduce the resistance encountered by the charge in passing from the crank chamber to the cylinder. The top of the piston is slanted downward from the upper edge of the deflector plate. Light drop forged connecting rods are used, and hollow wrist pins. The cylinders are cast with annular flanges on their side walls and vertical flanges on the head. The flywheel is developed in the form of a centrifugal fan, resembling a paddle wheel in general appearance. The action of the flywheel is to draw air into the bonnet

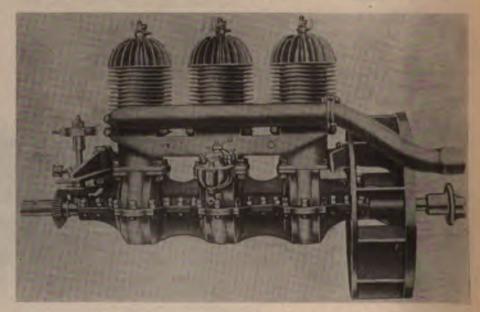


SECTIONAL SKETCH OF CHASE FRAME.
(Not to scale.)

space, which is open in front, and over the cylinders, and to force it out around its circumference. A dustpan underneath the engine, conforming to the circumference of the flywheel, renders the air circulation more effective.

A Holley carburetor is used, and connects through a cast iron manifold with the crank case inlet ports of the three cylinders. Fuel is carried in a 10 gallon tank in the front seat, and is fed to the carburetor by gravity. The Atwater Kent unisparker is employed for ignition. The make and break device is carried on a vertical shaft in front of the motor, and is driven by mitre gears from the crank shaft, and the coil is secured to the dashboard. The current for ignition is furnished by a dry cell battery. Only a single set of cells is carried, which furnish current for 500 to 700 miles. The oiling system of the engine is exceedingly simple. There are no oilers or oil cups of any kind on the engine, except one grease cup on the timer shaft, all wearing parts being lubricated by oil mixed with the gasoline before it is poured into the tank However, each of the main crank shaft bearings is provided with an oil tube for emergency lubrication by means of a squirt gun. These tubes are closed by spring pressed steel balls. It is the custom to mix I quart of oil with every 5 gallons of gasoline. This lubricating system is said to have proven particularly satisfactory in connection with delivery wagons of small tradesmen, which are often operated by apprentices. It is impossible to either adjust the lubrication improperly or to entirely forget turning the oil on. The amount of lubricant used is in exact proportion to the work done by the engine, and there is therefore no possibility of excess lubrication, with its attendant sooting of plugs and foul ex-

Directly back of the engine is located a single universal joint, from which a driving shaft extends to the encased planetary change speed gear, which is built in one unit with the bevel gear and differential on the countershaft. The change gear gives two forward speeds and one reverse, and is of the conventional type with fibre disc high speed clutch and bronze low speed and reverse brakes. The countershaft is mounted in Hyatt roller bearings. The bevel gears



CHASE THREE CYLINDER, TWO CYCLE, AIR COOLED MOTOR.



#### Los Angeles Garage Ordinance.

The Los Angeles, Cal., council has passed an ordinance regulating the conduct of garages, which is awaiting the signature of the mayor. It defines a public garage as a building where automobiles are kept or stored by the public, or are rented to or hired by the public, or where a charge is made for the use, storage or keeping of automobiles. A private garage is defined to be a building in which one or more automobiles are kept or stored for private use only.

For all new garages to be opened a permit must be obtained from the fire commission, and all garages must comply with the regulations as to gasoline storage. Applications made under the ordinance are to be referred to the fire marshal for investigation and report as to whether the establishment complies with the ordinance. It is provided that the fire commission shall revoke any permit if the ordinance is violated, but not without a public hearing.

Every building hereafter erected and every building hereafter altered for use as a public garage shall be of fireproof construction. Among other requirements is one that there shall be two chemical fire extinguishers provided for the first 500 square feet of floor space, and one for each additional 500 square feet. Four barrels of clean, dry sand, each provided with an iron scoop, are required to be kept in every public garage, to be used in extinguishing oil fires.

It is unlawful to maintain a public or private garage in any building used as a hotel, apartment house, rooming house or lodging house. It is also unlawful to keep more than 5 gallons of gasoline inside of any public or private garage, except such as is cortained in the tanks or reservoirs of automobiles stored in such garage; provided, however, that this shall not prevent the keeping of gasoline in portable filling tanks ir buggies, as provided in another portion of the ordinance. Only one portable filling tank or buggy, containing not to exceed 50 gallons of gasoline, is permitted in one garage. These tanks must be mounted on metal wheels, with rubber tires, and each one shall be equipped with a pump, fitted with a hose attachment not to exceed 8 feet in length, with a ground shut-off nozzle at the end. Gasoline must be pumped into the automobile from this tank. No tank of this construction may be used until the type or design shall have been approved by the fire commission.

Gasoline must be stored in tanks outside the walls of garages. These tanks may have a capacity of 200 gallons, except that not more than 400 gallons may be stored

for a public garage or more than 200 for a private garage.

Gasoline may only be stored in locations approved by the fire board. It is made unlawful to keep or carry about in any garage any gasoline in an open container. The portable tank must be kept at all times within 10 feet of the entrance of any garage. Smoking in any public garage is forbidden and signs to this effect are required to be displayed. Accumulation of sawdust, rags or rubbish about garages is also forbidden, unless kept in closed metal containers. Naked flames of all sorts are forbidden.

The fire marshal is authorized under the ordinance to enter any garage at any time to inspect it, and it is made unlawful to refuse him admittance or to interfere with him or any of his deputies.

The penalty for violations of the ordinance is a fine of from \$5 to \$500, or imprisonment for a term of not to exceed six months, or both fine and imprisonment. Each day the ordinance may be violated shall constitute a separate offense.

## To Prosecute Farmers Obstructing the Roads.

Motorists of Racine County, Wis., who have suffered long because public highways were obstructed or impeded by farmers who dislike the new method of travel, have determined to prosecute the offenders. The first case is that of Henry Plow, of Racine. against "John Doe," who is an unknown farmer. The charge is that the farmer unlawfully and unreasonably obstructed the road. Mr. Plow and party were returning home from Milwaukee when the farmer was approached. A second farmer came along, the two held a conference, and both headed toward Racine at a gait much slower than 4 miles an hour for more than 6 miles. When Mr. Plow signaled to be permitted to pass the wagons drove abreast.

## Standing By Law Proposed in Wisconsin.

A number of members of the Wisconsin Legislature are sounding sentiment among owners as to the passage of a bill at the next session providing for a penalty for failure to render assistance to persons hurt by motor cars. The proposed bill is to be known as the "standing by law," and is similar in effect to the Federal law requiring masters of vessels to stand by in cases of accident or collision. The suggestion is made that a clause be inserted in the bill making the failure to remain and render assistance prima facie evidence that driver was at fault for the accident and ground for action for damages.

## Milwaukee Motorists Fight Wheel Tax.

The Stern wheel tax ordinance now before the Milwaukee Common Council is being fought by business men and motorists on the ground that is is unnecessary and will be a hardship. The ordinance is not

likely to be passed. Its provisions are: Every barouche, sulky, cab, coupé, buggy, runabout, carriage or trap drawn by one horse, \$1.50; other one-horse vehicles, \$2. For two-horse vehicles, \$3.50 and \$6 respectively. For vehicles drawn by more than two horses, \$6 and \$10 respectively. Automobiles seating one or two persons, \$5; three to five passenger cars, \$7.50; six to seven passengers, \$10; more than seven passengers, \$12. Small motor delivery trucks, \$7.50; heavy trucks, \$15. Motorcycles, \$2.50.

## Beating Train Speed Not a Punishable Offense in New Jersey.

Frank G. Moore, of Philadelphia, who was reported to have boasted of beating a train on the West Jersey Division of the Pennsylvania R. R. with his automobile, was summoned by State Motor Vehicle Commissioner Smith, of New Jersey, to show cause why his license should not be cancelled. Mr. Moore, however, showed by the railroad schedule that the train made an average speed of less than 25 miles per hour, and as several witnesses also testified that the speed of the automobile had been kept within the legal limits his license was not revoked. The only charge that could be made against Moore was that he had used his car for racing. but it was ruled that the particular clause of the State law referred to racing between automobiles, and did not cover the case of racing between an automobile and a train.

Legal Notes.

The Kayton Taxicar and Garage Company, New York, have placed an order for forty additional Atlas taxicabs, of which make they already have twenty-six in service. The cabs are to be delivered by October 15.

Mayor D. S. Rose, of Milwaukee, Wis., has signed and placed in effect the council resolution prohibiting motor cars to occupy any portion of Grand avenue or Wisconsin street, from Seventh street to Jefferson street, longer than to discharge or take on passengers. The resolution is aimed at taxicab and for hire stands.

Owing to a delay in making the badges the Indianapolis drivers' registration ordinance will not be enforced until about September I. About 350 drivers have already applied for registration. It is expected that the ordinance will be tested by several drivers, who insist the city has the right to license and register only professional drivers and not men who drive their own cars.

The Georgia State automobile bill failed in the House of Representatives on August 9. The vote on the measure was 87 to 22, while to pass it would have required ninety-three votes. Immediately after the defeat of the bill it was moved that the House reconsider its action in defeating the bill, and the motion was adopted, so that the bill will probably come up again. Among the most important features of the bill is a pro-



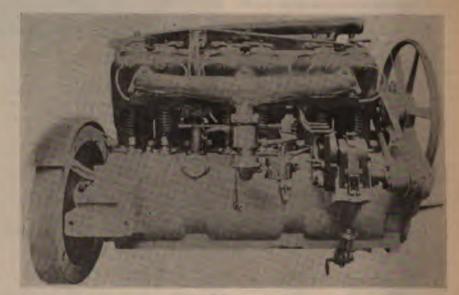
THOMAS MODEL M SIX CYLINDER, FORTY HORSE POWER TOURING CAR.

bearings being bushed with die cast babbitt bushings, which are easily renewed, since they are interchangeable. The cam shaft bearings are of bronze. The crank shaft is a carbon steel drop forging, heat treated. The connecting rods are of 3½ per cent. nickel steel. The cam shafts are also of nickel steel, as are the connecting rod bolts. The flywheel, instead of being an iron casting, as in the majority of cars, is cast of steel, and an accident due to racing of the motor is therefore impossible.

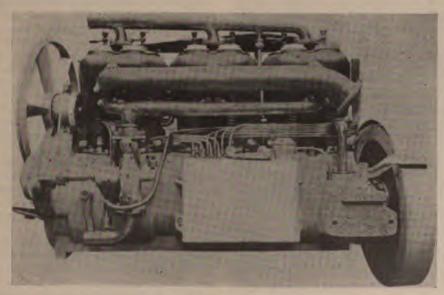
Particular effort has been made in designing the motor to insure quiet running. Thus, the cam gears are made of the herringbone type, of steel and phosphor bronze, respectively; the valve plungers have been provided with fibre inserts, and the clearance of the valve stem bearings has been reduced about 50 per cent. In order to insure absolute balance the pistons of all the cylinders are standardized in weight, all revolving parts are carefully balanced, and the compression spaces of all the cylinders are equalized.

The Thomas three disc clutch, used on former models, is retained on the Model M. The clutch disc is carried on two imported annular ball bearings, so a scarcity of lubricant will not cause dragging. Two universal joints of the internal gear type are inserted between the clutch and the change gear. It is stated that this type of universal joint has given entire satisfaction in service on motor trucks where all other forms of joints failed. The clutch is provided with cork inserts and has a double adjustment. By cranking the cross shaft of the clutch mechanism the clutch has been made much easier to operate. The change gear weighs complete only 82

The change gear weighs complete only 82 pounds, and is equipped throughout with imported annular bearings. It was designed to secure very short shafts, so as to be very rigid. The distance from centre to centre of the annular ball bearings on the countershaft is only 8% inches. Six annular bearings are used in the gear box. The gears



INLET SIDE OF MOTOR.



EXHAUST SIDE OF MOTOR

are nickel steel, case hardened, the case hardening process consisting in carbonizing in powdered bone, allowing to cool in the pot, reheating to between 1,375 and 1,425 degrees, and finally quenching in oil.

The rear axle is a Timken axle, with pressed steel casing and Timken roller bearings throughout. The bevel gears are of four pitch and give a speed reduction of 3 to 1. The company state that they tried out one of these axles on a heavy car of greater horse power without discovering any signs of weakness. The front axle, as well as the steering knuckles, are made of nickel steel. The springs are of alloy steel.

The ignition is effected by a Bosch DR-6 magneto, which furnishes current to one set of plugs, and an Atwater Kent unsparker, which supplies the second set of plugs. The engine piping is of drawn copper tubing, and is consequently quite light. Among the improved details on the new model may be mentioned the ball and

socket joints in the magneto and carburetor control mechanism, which is very closely adjustable. The wiring is carried in carefully designed housings. The fenders and running board apron absolutely protect the passengers against splashing mud.

#### Eisemann High Tension Dual Ignition System.

This system is designed to fill the demand for a magneto system which permits of starting the motor from the seat. It comprises a Type E K magneto, a non-vibrator dash coil combined with a high and low tension switch. The make and break mechanism and the high tension distributor serve for both the magneto and the coil, and the distributor is positively connected to the make and break mechanism, so that both are advanced or retarded in unison, and the distributor arm is therefore making contact with a segment at all times when the make and break contacts are in the firing position. This feature and the formation of the laminated armature core, which is of the

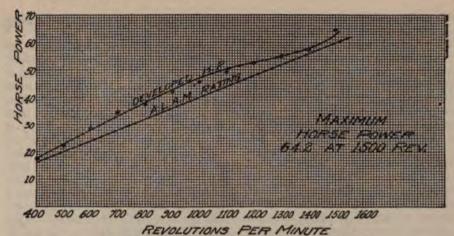


STARTING COIL.

modified H type, make the system particularly suitable for two cycle engines, because of the wide timing range of the magneto. The magnetic field is produced by two, three or four simple or double magnets, according to the size of the magneto. The pole pieces are of new design, the edges being cut along helicoidal lines instead of being straight. With this construction the armature is in touch with the pole pieces, or a greater portion of revolution than in former design, and the range of spark lag and lead will be greater on account of the more even field.

The armature is of the double T type, the central part being laminated. The primary winding is wound directly on the core of the armature, being insulated from the latter by several layers of high grade insulating silk, and the secondary winding is wound on the primary. One end of each winding is grounded, the other end from the primary is connected with the breaker, and that of the secondary with the slip ring or collector.

The starting coil includes a stationary induction coil with condenser for increas-



Horse Power Curve of Thomas Six-Forty Motor.

ing the voltage of the battery current and the switch which carries the high and the low tension currents at the same time. This switch is constructed of copper segments inserted in thick hard rubber, and is claimed to be perfectly proof against leaking and wearing.

#### The Palmer-Moore Low-High Speed Two Cycle Motor.

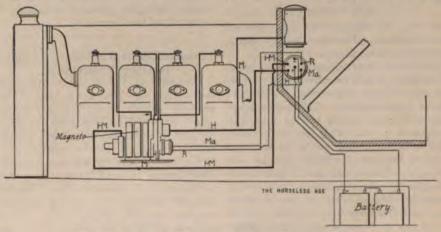
The Palmer-Moore Company, of Syracuse, N. Y., who have recently removed from 315 East Washington street to corner Tallman and Oneida streets, have had a patent allowed them on a new design of two cycle motor which they intend to develop for automobile purposes. The company have been manufacturing two cycle motors for marine work for a number of years, and the new motor is a development of their marine motor, the recent improvements enabling it to run at high speed and to develop proportionately more power.

A feature of the Palmer-Moore marine motor, and also of the new motor, is that the combustible charge is not compressed in the crank case, as in the majority of two cycle motors, but in a closed chamber underneath the piston. In the lower portion of the cylinder there is a smaller cylinder which acts as a crosshead guide. The working piston is connected to a piston rod which extends through a stuffing box in the head of the crosshead guide, and is fastened into a crosshead at its lower end.

This enables the company to get any desired amount of precompression. In the engines so far made the precompression is carried at 12 pounds per square inch. The marine motors are of the open base type, the cylinders being carried on four steel columns, as shown in the accompanying sectional sketch. The automobile motors are to be of similar construction, except that side plates will be provided for enclosing the base.

The engines are made in both a two port and a three port type. The novel feature of design above referred to consists in the provision of double transfer and exhaust ports. The two sets of ports are located one above the other, and are of the same width. The lower ports are of the same size and similarly located as those used in the slow speed marine motors, and when the engine is being operated at slow speed only these ports are effective, the upper ports being then closed by means of simple rotary valves.

The various valves are all connected together, and are held closed by means of a single spring and opened by means of a foot button. The valves consist of cold rolled steel pins of about 1 inch diameter placed in holes drilled into the cylinder castings, one side of the pins being flattened opposite the ports. The theory of the design is as follows: In order to enable a two cycle motor to run at high speed the ports must be much wider than they are



WIRING DIAGRAM OF EISEMANN DUAL IGNITION SYSTEM.

also to be slightly increased and the contour altered to permit of greater sweeps in entering and leaving the stretches.

The Kissel Motor Car Company, of Hartford, Wis., has started construction work on a new factory building 50x130 feet in size and four stories high. A new warehouse, 220x44 feet and two stories high, is nearing completion.

#### Garage Notes.

E. S. Dale will shortly open a garage in Rugby, N. Dak.

D. N. Betts, Chickasha, Okla., is rebuilding his garage, which was destroyed by fire recently.

The Aberdeen Automobile Co., Aberdeen, S. Dak., are erecting a garage at Second avenue and First street.

J. L. Hovering, San Diego, Cal., will erect a garage building at the corner of Fifth avenue and Fifteenth street at a cost of \$3,000.

R. E. Peerce, Walzenberg, Col., is having a 40x60 foot garage building erected on Main street. The building is of brick and fireproof.

C. N. Tuxbury, Marblehead, Mass., has opened his new garage on Atlantic avenue, which will be under the managership of Fred Lewis.

C. W. Bogga, McPherson, Kan., is erecting a 24x60 foot garage building on South Main street. He will do a general repair and livery business.

The Resthaven Co., of Waukesha, Wia., have purchased the lot on the corner of Hartwell and Arcadian avenues, on which they will erect a garage building.

The Missouri Motor Car Co., recently organized in St. Louis, Mo., have moved into their downtown salesroom at 1131 Olive street. H. L. Schnure is secretary of the company.

E. W. Harvey, Marysville, Cal., is taking steps to build a garage. Mr. Harvey has bought a lot at the corner of B and Seventh streets. He may also take up the manufacture of automobiles.

A four story reinforced concrete building to cost \$50,000 is to be erected in Louisa street, Oakland, Pa., in the near future for use as an automobile garage. For the site \$15,000 was paid.

The Plaza Auto Garage, 33 to 39 East Fiftyeighth street, New York city, has been leased by H. L. Crafts and H. R. Shaw, who will remodel the building and make a specialty of repair work.

The Albany Garage Co., Albany, N. Y., have purchased the property at Howard and William streets, and will erect a new building connected with their present garage. The price paid for the site is said to be \$20,000.

The Franklin Motor Car Co., Philadelphia, Pa., has let the contract for its machine shop and garage building at 3430 Chestnut street, and work is to begin immediately. The site is 39.10x120.6 feet. The new building will cost \$12,000.

A new garage is being erected on Long Beach boulevard, Long Beach, N. Y., and will be open for business at the end of this month. It is a 100x80 foot structure and has three wide entrances. A full line of supplies will be carried.

The garage which has been erected for D. B. Reigle on Marsh avenue, Kinsley, Kan., has been completed. Mr. Reigle has the agency for Regal and Oakland cars, and will do a general repair and garage business. The building is constructed of cement throughout.

The Southern Brush Auto Co. has opened show-rooms at 256 Edgewood avenue, Atlanta, Ga., to handle Brush runabouts and delivery wagons. J. J. L. Phillips, of Tifton, Ga., holds the State agency for the Brush car, but the Atlanta office will be in charge of F. H. Lincoln, of Detroit.

H. J. Lamar and F. J. Long, of Atlanta, Ga., have formed a partnership under the name of the Olds-Oakland Co., and will handle these two lines of cars at the garage now occupied by Mr. Lamar. Mr. Long was formerly connected with the Buick branch in Atlanta, but resigned to take an interest in the Olds-Oakland Co.

The Horn & Hardart Baking Co., of Philadelphia, have purchased the premises at 242 to 248 North Broad street, and will immediately erect a

three story reinforced concrete structure, a part of the ground floor of which is to be rented as an automobile garage. The premises are at present occupied by automobile firms, and they have been notified to vacate.

W. M. Gordon, Nevada, Mo., is erecting a garage building. Originally it was intended to be only a single story high, but as the owner of an adjoining hotel desired additional room, Mr. Gordon decided to make the building two stories high and rent the second story to the hotel proprietor. It is to be divided into several suites and adequately furnished, and will be connected with the hotel by an aerial passageway.

The Wichita Automobile Co., a new concern recently organized at Wichita, Kan., are erecting a \$15,000 brick garage on North Rock Island avenue. The company consists of W. O. Sterberg, Jr., and Fred Lampl. The building cwill be 50x150 feet and have a front of red pressed brick with plate glass windows. Cement floors will be laid. The building will be ready for occupancy early in September. The company expect to take on several lines of automobiles.

#### New Incorporations.

Pope-Hartford Co., Newark, N. J.—Capital stock, \$30,000.

Stevensville Rapid Transit Co., Helena, Mont.— Capital stock, \$10,000. Incorporators, R. T. Spaulding and others.

The Baker Manufacturing Co., Omaha, Neb.—Capital stock, \$10,000. Incorporators, A. S. Baker, J. S. Baker and H. T. Bailey.

Homer Motor Car Co., Los Angeles, Cal.— Capital stock, \$75,000. Directors, Lew W. Collins, A. E. Ensign and A. Schleicher.

Pitts Anti-Skid Chain Co., Chicago, Ill.—Capital stock, \$50,000. Incorporators, Jay F. Pitts, F. V. Detwiler and L. J. Schmidt.

Eureka Auto Supply Co., Chicago, Ill.—Capital stock, \$2,500. Incorporators, P. M. Henry Guerin, M. F. Gallagher and E. H. Williams.

The Electric Garage Co., Omaha, Neb.—Capital stock, \$30,000. Incorporators, George M. Redick, Denise Barkalow and Oak C. Redick.

Ferris-Dunlap Motor Car Co., Houston, Tex.— Capital stock, \$10,000. Incorporators, Floyd A. Ferris, C. E. Dunlap and Neill White.

Linkroum Automobile Co., Trenton, N. J.—Capital stock, \$20,000. Incorporators, C. Linkroum, Wm. H. Linkroum and Chas. R. Erith.

Union Motor Car Co., Newark, N. J.—Capital stock, \$125,000. Incorporators, Peter Broderson, Forcest C. Stoeers and Andrew Broderson.

C. A. Coey Auto Service Co., Chicago, Ill.— Capital stock, \$200,000. Incorporators, Chas. A. Coey, Chas. E. Gregory and D. Henderson.

Ranger Automobile Co., Chicago, Ill.—Capital stock, \$2,500. Incorporators, Frank A. Ramacciotti, Geo. A. A. Schmitt and Ernest Saunders.

Victor Windshield Manufacturing Co., Chicago, Ill.—Capital stock, \$2,000. Incorporators, John McGaffey, Arthur L. Haake and S. S. Gorham.

Essex County Overland Co., Newark, N. J.— Capital stock, \$100,000. Incorporators, Wm. F. Acker, Roland D. Crocker and Harry H. Poole.

Southern Automobile Co., Muskogee, Ind. Ter.—Capital stock, \$4,000. Incorporators, S. H. Criswell, John C. Beugler and Etta E. Criswell. Chicago Automobile Self Starting Appliance Co., Chicago, Ill.—Capital stock, \$70,000. Incorporators, C. E. Crane, Harry Hobbs and Chas.

Hot Springs Auto and Taxicab Co., Hot Springs. Ark.—Capital stock, \$25,000. Incorporators, Harry M. Westcott, E. W. Stearns and Hiram A. Whittington.

The Falls City Automobile and Garage Co., Louisville, Ky.—Capital stock, \$50,000. Incorporators, W. J. Day, R. J. Hogan, H. C. Shanks and B. B. Boles.

The Welland-Pope Co., Cincinnati.—Capital stock, \$10,000. Incorporators, H. B. McClelland, A. L. Pope, Carrie A. Pope, Clifford Welland and M. Bernhart.

Parker Motor Co., Hartford, Conn.—Capital stock, \$50,000. To manufacture motors, automobiles, automobile parts and all kinds of machinery.

Incorporators, Lucius F. Robinson, Francis W. Cole and Albion B. Wilson.

The Harper Livery and Sales Co., Charlotte, N. C.—Capital stock, \$50,000. To operate back and automobile lines. J. P. Harper, president; Dr. M. J. Ragland, secretary and treasurer.

#### Trade Personals.

R. S. Ireland, formerly Eastern sales manager of the Ajax-Grieb Rubber Co., has been made sales manager.

Chas. O. Du Mars, formerly factory salesman for the Fisk Rubber Co., has returned to Los Angeles to manage the local Fisk branch.

George S. Waite, who was formerly connected with Alvan T. Fuller, of Boston, has been appointed general manager of the Simplex Motor Car Co., Mishawaka, Ind. E. L. Thomas, son of E. R. Thomas, has been

E. L. Thomas, son of E. R. Thomas, has been appointed commercial manager of the E. R. Thomas Motor Co., Buffalo, N. Y., upon his father's return from Europe.

Sales Manager J. D. Morse, of the Citizens Auto Car Co., Hobart, Okla., has retired from the firm, which will in future be conducted by the remaining partner, W. E. Beard.

E. S. Walraven and C. M. Love have been appointed managers of the sales department of the Studebaker branch in Atlanta, Ga. G. W. Hanson continues as general manager of the branch.

K. T. McKinstry, Atlanta, Ga., has resigned his position in the automobile sales department of the Columbus Buggy Co., and has taken charge of the automobile department of E. D. Crane & Co., Atlanta, Ga.

Robt. G. Pilkington has been placed in charge of the gasoline commercial car work of the Stude-baker interests in Detroit. He is known to readers of THE HORSELESS AGE as an occasional contributor on this subject.

J. H. Raymond, for six years foreman of the repair department of the Olds Motor Works at Lansing, Mich., has accepted a position as manager of the Chippewa Falls (Wis.) Automobile Co., an agency and garage concern.

R. B. Van Dyke has been appointed manager of sales of the American Locomotive Co. automobile department, and will make his headquarters at the New York office, 1886 Broadway. Mr. Van Dyke has been connected with the Locomotive Co. for a number of years.

Frank H. Bowen, who has been actively connected with the automobile trade for the past eight years, recently with the Harry S. Houst Co. handling Thomas cars, has joined the sales force of the Simplex Automobile Co. at the new headquarters, 1860 and 1862 Broadway, New York.

#### New Agencies.

Los Angeles, Cal.-

William Mountain, Royal.

Howard Automobile Co., Chadwick.

Janesville, Wis.—Blodgett & Holmes, Ford.

Trenton, N. J.—Jonathan B. Gundling, Lozier.
Los Angeles, Cal.—Woodill Auto Co., Oakland.
San Francisco, Cal.—Leavitt & Co., Overland,
Reo, Stoddard-Dayton and Marion cars.

Atlanta, Ga.—J. E. Levi & Co., Reo and Premier.

Minneapolis, Minn.—M. R. Waters & Sons, Stevens-Duryea.

New Bedford, Mass.—Wayland L. Sturtevant, Chalmers-Detroit. Hudson.

#### Trade Literature Received.

Barrett Manufacturing Co., New York.—Road Preservation with Tarvia.

Matheson Automobile Co., Wilkesbarre, Pa.— Matheson six cylinder car instruction book.

The Oscar Lear Automobile Co., Springfield, Ohio.—Catalogue of Frayer-Miller motor trucks.

The Dayton Rubber Manufacturing Co., Dayton, Ohio.—The Dayton Airless Tire, one of Dayton's Twin Triumphs.

Thordarson Electric Manufacturing Co., 216-20 Jefferson Street, Chicago, Ill.—Catalogue of Thordarson's electrical specialties, including spectagolia.

# The Horseless Age

First Automobile Journal in the English Language

VOLUME XXIV

NEW YORK, AUGUST 25, 1909

NUMBER 8

#### Simple Tests of Ignition Parts.

By W. A. STILES.

There is probably no part of the mechanism which goes to make up the modern automobile that is so little understood as is the ignition system. The average car owner understands that when his engine begins to miss fire he can change the adjustment of his platinum points; he understands that he must renew his batteries from time to time when his ampere meter shows that they are fairly well run down, but here his knowledge usually ends. Of the magneto he understands little or nothing. If he studies over the technical articles and wiring diagrams given from time to time in the trade paper to which he may be a subscriber, he sees nothing but a confusion of lines and a page or two of unintelligible technical description.

This being the case, it is small wonder that his ignition system should be the "goat" for all real and imaginary evils. Any coil or magneto manufacturer will tell you that fully 50 per cent. of the repairs sent him in the course of a year are placed on a test bench, tried out and found to be O. K. and returned to the owner. Nor are the private owners of cars the only ones who make this mistake. Repair shops, when at a loss to account for some strange behavior of the car, will often fall back on that time honored verdict, "Coil burned out." Often they are sincere in their condemnation, having persuaded themselves because the engine does not fire well that the ignition is at fault, when as a matter of fact carburetor troubles or a hundred other things may be the source of the annoyance. I have received letters from customers which read about as follows:

"GENTLEMEN-I am returning to you by express today one of your coils which is burned out. My engine started missing badly this morning, and an expert on your system whom I called in says the coil is burned out \* \* \*." (Oh, these experts!) Upon receipt of the coil a thorough examination would disclose absolutely nothing wrong, and the coil would be reshipped to the owner. The strange part of the whole affair is that the coil almost invariably "works well since you fixed it." One can easily see how much time is wasted on both sides by neglect of a thorough examination which would place the fault where it belongs. A few set rules, therefore, may not be amiss in helping the layman out of any difficulty which may seem, at first glance, to indicate ignition troubles.

TEST OF SPARK GENERATING PARTS.

We will suppose, then, that our friend, the motor car owner, has taken his family out for a Sunday afternoon spin. His engine has been running smoothly and he anticipates no trouble on the road, but after about 8 or 10 miles his machine runs jerkily and ceases to explode in the desired manner. Or it may be that the engine coughs, backfires and stops.

This is the time when he should restrain his desire to sally forth with a screwdriver and monkey wrench and prod at the "innards" of the machine. Instead he should, if his ignition system is that of a vibrator coil, first get out his ampere meter and test his batteries to see whether this may not be the source of his annoyance. While he is at it it would not be amiss to glance over them and make sure that there are no binding posts on adjacent batteries touching. Having ascertained this, the next thing is to crank the engine, if it has stopped, and endeavor to get it to run in any way to test it. If this is impossible it will be necessary to crank it by hand while the following test is being made: Remove the secondary wires, one by one, from the spark plugs, letting the engine run on three cylinders, or whatever the remaining number may be. Hold the terminal of the loose wire about three-sixteenths to onequarter of an inch from any metallic part of the mechanism, and note the spark delivered. If it is regular, without any intermittent missing, try the next one, and so on with all cylinders. Provided that they all appear to be sparking nicely, examine the spark plugs, and should these be found clean and free from split porcelains, it is a moral certainty that a good spark is being delivered to the cylinders, and that the fault lies elsewhere, probably in carburation. It may be possible that the timer has slipped, and this may easily be determined by opening the pet cocks of the engine and turning it over slowly. The spark should occur just after the air has stopped hissing out of the pet cocks on the compression stroke, which should not be confounded on four cycle engines with the expulsion stroke. Of course this is merely a rough test, but any slippage of the timer which would put the engine out of business would be easily noticeable in this way.

TEST FOR SHORT CIRCUITS.

We will suppose, however, that little or no spark is noticeable at the terminals.

The next logical thing to do is to find out whether or not the current is being delivered from the coil or magneto, and has been "lost in transit," or, in other words, short circuited. To accomplish this in the case of a coil, remove one of the secondary plug leads from the terminal post on the box, and with a short piece of wire provide an air gap of about one-quarter of an inch between this post and any primary or low tension post, which will be grounded. If, upon cranking the engine a good spark is seen, the conclusion to be drawn is that the current is being grounded somewhere between the coil and the plugs, probably by faulty secondary wiring. To test for this trouble on a magneto, remove one of the secondary leads from the distributor cap, and jump the secondary through an air gap as with the coil. The remedy for leaky secondary wires is, of course, obvious

#### REMEDIES.

Having traced the current back to the coil or magneto, we will assume that, for some reason, one or more of the high tension leads is not delivering the current. In the case of the magneto, the probability is that the fault lies in the distributor. Water or mud will sometimes short circuit one or more terminal posts, but is easily seen and as easily removed. If the trouble is that of breakage, the best advice to the average owner is to throw up his hands and have the magneto repaired at the factory or a factory branch, and not at a repair shop.

In the case of a coil, the first thing todo after having traced the trouble thus far is to try an adjustment of the platinum contacts, first loosening them a bit and then turning them up tighter. If this does not improve matters, examine all primary or low tension contacts to make sure that there is no spot of high resistance in the circuit. Examine the timer and see that the spring inside is not broken. Try all timer leads, in case there should be a broken one.

If all these things fail the coil unit is indeed burned out, and replacement is the only course.

An intermittent spark with a vibrator coil is often caused by pitted platinum points, and may be fixed by filing the latter with a very fine file, or rubbing them with emery. A uniformly weak spark at all plugs, accompanied by excessive flashing at the vibrator points, indicates a broken down condenser, the only remedy in this case also being replacement. This, is something that seldom happens, however, and trouble manifests itself slowly. A uniformly weak

spark with a magneto (high tension), especially in the case of an old one, indicates that the field magnets have become weakened, and should be remagnetized as soon as possible, although there is a possibility that the armature winding is burned out. Such things are, however, out of the hands of the novice.

If trouble suddenly develops during a rainstorm, or while riding over muddy roads, it is very probable that water or mud is short circuiting the secondary current. This is especially liable to happen on a distributor system which is not well protected from splash, and a thorough cleaning will remedy the trouble at least temporarily. Cars which are kept in public garages will often give trouble from the same cause upon starting in the morning, due to careless washing.

#### SUMMARY.

To sum up, it may be said that not once in a hundred times will trouble on a car be found due to a broken down coil or magneto. Either may be out of adjustment, or dirty, or their accessories, such as the timer, plugs, wiring, etc., be at fault. but the coil seldom. So true does this rule hold that no one should undergo the expense and delay incurred by sending a coil back to the factory without putting it to an impartial test. If it be a coil connect it up with the proper number of batteries and ground the secondary through an air gap. If it be a magneto rig it up on a bench so that it can be run at, say, 600 r. p. m., and test the secondary by grounding, as with the coil. Then, and then only, can one be sure when the coil does go back for repairs that those repairs were needed.

#### Valve Diameters.

BY F. E. WATTS.

The two most important improvements in motor design during the past two years have been a rather general increase in the length of stroke and in the valve diameter for a given bore. Both of these changes have resulted in more powerful motors with greater maximum power, and giving rather stronger torque at low speeds.

Most motors have poppet valves with conical seats, as shown in the illustration. The gas passes the scat of such a valve in a more or less perfect hollow cone, depending upon the shape of the surrounding parts of the motor. The walls of this cone will have a thickness L, depending upon the lift of the valve (see Fig. 1). The development of the opening will be that of a conical ring (see Fig. 2). The area can be found more readily, however, if the development is considered as taking the form of Fig. 3. Here the area is equal to  $2\pi R'L$ , where R' is the radius to the centre of the opening.

It is probable that for a given kind of work this area should bear an approximately constant ratio to the volume of gas which the motor cylinder handles per minute. Or

A few years ago the common inside diameters for valves were about one-third of the cylinder bore. The vertical lift of the valves varied from 1/8 inch to 3/8, 1/8, and even to 1/2 inch in some of the larger motors. The present day demands for more powerful and silent motors have altered these conditions, and at the present time the inside diameter of valves is usually from 0.4 to 0.5 of the cylinder bore. In next year's cars, so far as they have been announced, this diameter is very nearly half the cylinder bore. Most makers have settled on a vertical lift of five-sixteenth inch, which makes the dimension L about 0.22 inch for 45 degree seats.

This lift is about the maximum which can be used with ordinary valve mechanisms at high speeds without the valves becoming noisy. Some makers even use slightly smaller lifts to secure an unusually quiet

action. Since 45 degree seats are almost universally used, and all lifts are practically alike, the valve openings for different motors may be said to vary with the radius R'.

For practical motors for touring and general work the limiting piston speed may be taken as 1,000 feet per minute. For such motors valves having a clear diameter of one-half the cylinder bore are found to supply sufficient charge to maintain the torque in cylinders up to 5 inch bore. For small bore cylinders the valve diameter does not need to be so large in proportion to the bore. If we do not take into account the log of the gas or if we time the valves so as to neutralize its effects for usual speeds then the following relation should exist:

Piston displacement per minute = A constant.

or, 
$$\pi \frac{D^2}{A} P : 2\pi R' L = \pi \frac{D'^2}{A} P : 2\pi R'' L$$
,

Where D and D' are the cylinder bores. R' and R" the mean radii of the valves, and P is the piston speed (1,000 feet per minute). L is the valve lift as before.

Eliminating constants we have:

$$D^2: R' = D'^2: R''$$

Considering that, owing to the differences in the shapes of the surrounding parts, all such comparisons are only approximate, we may use for R' and R' the inside or "clear" diameters d and d'. The formula then becomes:

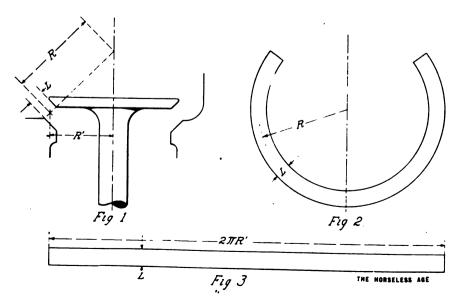
$$D^2: d = D'^2: d'$$

If for D = 5'',  $d = 2^{1/2}''$  for good supply, then for a motor with 3 inch bore d' would be found by the equation:

$$(5)^2 : 2\frac{1}{2} = (3)^2 : d'$$
  
 $d' = 0.9''$   
So  $d' = \text{only } 0.3 \text{ D'}.$ 

Nevertheless motors with bore as small as this are frequently made with valves whose clear diameter is about one-half of the bore. Such motors are consequently capal le of very high speeds and deliver a great deal of power for a given displacement per stroke. Indeed, they are so powerful and run so fast that they are likely to wear out rapidly, and quickly become noisy in the hands of the average operator. So it is probably best at the present time to sacrifice something in the way of maximum power and keep the valve diameters down to what we have suggested for a 5 inch bore, or possibly a little below that. Or if an exceptionally quiet motor is desired, the diameters may be made larger, if the bore is small enough to allow of this being done without danger of their warping, and the lift reduced a corresponding amount to give the same clear opening. These large diameter small lift valves have much to recommend them,

At the present time it is most common to make inlet and exhaust valves of the same size, and to lift them the same disstance, the greater capacity necessary for the exhaust being obtained by the longer time it remains open. This practice appears to be justified by the results obtained.



### Maintenance and Repairs



## Cost Keeping in the Repair Shop.

BY CHESTER S. RICKER.

The large repair shops in New York city are in many ways comparable to a small factory, yet methods of cost keeping applicable in the latter are often impracticable in the former. However, a system which has the earmarks of the factory has been developed and applied in one of the largest repair shops in the city. The system hereinafter described is due to Messrs. Emmerson & Lees, of New York. Their methods in six months have brought an expensive and nonpaying shop on a profitable basis, without materially increasing charges to customers. The means by which this has been accomplished may prove of value to others, and the writer will try to describe the systemas fully as space will permit.

#### COST OF WORK.

The table given by F. E. Watts in his article on "Decreasing Cost Due to Increasing

W B T O  NOTE NORMAND NAME CAR CUSTO  DATE ACT.TIME W  TARTITION  TORRIGOR TORRIGON  T	K 0-07-1
ACT.TIME W. T.	•
OPERATION B	MER
OPERATION B	OST
AP-100 PM-94(0)	
37 4400	
TO()	
CARD NO HOURS RATE	AMT
OH. FOREHAN	

Fig. 1.

Market," in the July 28 issue of THE HORSE-LESS AGE, will be found to be applicable to the repair shop in many respects. However, to show wherein the two differ the following outline is given. A comparison with Mr. Watts' will make clear.

#### ORDERING REPAIRS.

In addition to the repair shop this company has one of the largest garages in the city, from which is drawn most of the trade which the shop has. Before any car is taken into the shop, however, the bookkeeper must O. K. the customer's account. This precaution avoids much ill feeling and trouble, as well as loss. Chauffeurs are permitted to have repairs made on their own order up to some predetermined sum, in most cases either \$25 or \$50.

#### ASSIGNMENT OF WORK,

As soon as a car arrives in the shop the necessary work required is noted by the foreman. He then proceeds to fill out the service cards, one of which is shown in blank in Fig. 1. The spaces under Car and Customer are filled in at this time, as is also the spaced designated Operation. Only one small specific operation is given on a card, and a number of cards are used for each order. Take, for example, the simple operation of relining the brakes. Cards might be made out bearing the instructions: "Take off the rear wheels"; "Remove brake shoes"; "Reface shoes"; "Replace shoes"; "Put wheels back in place." Thus five service cards might be used for a simple repair like this. All should have the same order number, however.

After the cards are filled out in this manner by the foreman they are turned over to

Prod. Labor		Non-Prod. Lal	por
Mech.	Hrs.	Hrs.	_
Help	4	"	
Cast			

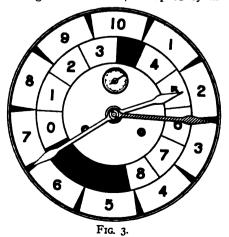
Fig. 2.

the time clerk. Unless the foreman wishes some one man to do a job, he does not give the workman's name and number. This is left to the time clerk, who can determine best to whom the job should be assigned.

In order to facilitate this allotment a special rack is provided for these service cards. This rack is within easy reach of the time clerk's desk. Each man has three places in which cards may be filed. In one are put the slips which represent the job the workman is doing at the moment. In the second are put the assignments which are to be taken up as soon as the work in hand is finished. In the third are put those which can be done at odd times when there is nothing else on hand. By this method it can be seen at a glance who will need a job next, and work can thus be allotted so as to keep everyone busy the greater part of the time. All that a man has to do under this system is to bring in his slip which covers the work just finished, and be given the next one of the series.

#### SERVICE CARDS.

Now let us take up those spaces on the card not yet considered. W designates wages, B burden, T total or shop cost, and O order number. The values given for wages, burden and total, on the top line, where these letters appear, are for the hour for this man, the burden varying according to the department in which the man is working. These values, multiplied by the



actual time, give values for wages, burden and total cost, which are entered on the card under "Cost." "Time Quit," "Time Started" and "Time Elapsed" need no explanation, except that all time is kept in hours and tenths, as will be described later.

At the end of the day, if a man cannot finish his job, he hands in the card with a check opposite "Unfinished" and an O. K. from the foreman. The next time he comes in he is given a new card with a check opposite "Continued." When the job is finally complete "Finished" is checked and the foreman O. K.'s the slip.

The space in the lower right hand corner is reserved for the bookkeeper's convenience. As each card is given to the time keeper he files it in a card index divided according to the men's numbers. Each card is filed in the order it is handed in to the clerk. At the end of the day the clerk fills in the card number, the cards being numbered consecutively from I up, beginning with the first man's and going straight through the day's cards, irrespective of the men's own numbers.

#### FILING SERVICE CARDS.

A quadruple carbon copy is made of each of these service cards. The original cards are grouped acording to their order number. The time and shop costs of this order, that is, the sum of the time and shop costs of the various operations which go to make up the order, are found and entered on a ticket similar to Fig. 2, which is then pinned to this order group.

The second copies are assorted according to the men's numbers, and sent to the auditing department to make up the payroll.

Third copies are grouped with respect to the order number and filed in the cost keeping department. In this department, also, are filed the fourth copies, but these are grouped acording to the men's numbers and also card numbers. From experience the following colored slips have been found most satisfactory: White, yellow, pink and very light blue.

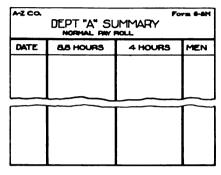
#### HOW TIME IS KEPT.

The unique dial of the time keeping clock is reproduced in Fig. 3. The hour is divided into tenths, and the normal day is 8.8 hours, but Saturdays there are only four working hours, thus making a total of forty-eight hours for the week.

During the morning hours the shaded minute hand is read, but when one returns after lunch this hand will be sixtenths of an hour ahead with respect to the hour hand and the clock divisions, because thirty-six minutes are allowed for lunch, and the clock, of course, is not stopped during that time. The hour hand will just be beginning the fourth hour when the morning minute hand has reached 12:36.

It will also be noted that the tenth divisions in reality begin three minutes late. This much leeway is purposely given each man for unavoidable delays at noon and in the morning. However,

	PRODUCTIVE			NON-P	ROD	UCTIVE
DATE	WAGES		HOURS	WAGES		HOURS
2						
3						
4						
29						
30						
31						
						-



F1G. 4.

if he comes four minutes late he loses not one or four minutes but nine.

#### DEPARTMENT SUMMARIES.

In order to lessen the work required in determining the burden charges, summaries are made up monthly for each department. Examples of the two types used are given in Figs. 4 and 5.

Department A constitutes the clerical force who receive salaries. Their time and salaries ordinarily will be entered in the non-productive column. If, however, some one in this department does productive work this is put in that column. and the difference between this and the normal salary is placed under non-productive labor. The total wages for that day will then be placed as an item on the reverse of the card. The reverse side is used only under these circumstances.

The "productive" departments also have a card, but of a different type. The one shown of Department B, Fig. 5, is the uniform type used. The items "Late per Hour" and "Cost O. T." (overtime) are the only ones which may not be self

evident. The reverse is used only when overtime work is done or when some productive man does clerical work. Each department has a different card, because the burden varies with each. The following is a list of departments into which this shop has been divided:

Depart-Department. ment. Office force. Foundry.

B. Mechanics. Electrical. C., Helpers.

D. Tinsmiths. н Road men and testers

Forge.

WORKMAN'S DAILY RECORD,

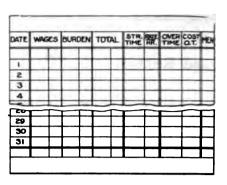
Fig. 6 illustrates the card used to keep account of each workman's daily record. A summary is made out each week in

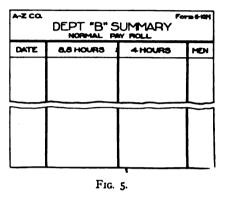


the space which is dated for Sunday. If normal time only has been worked the card is simply checked. It is from these cards that the monthly payroll record is made. The total wages are entered under that heading, and the cost of the

overtime is itemized in a separate column.

MONTHLY PAYROLL RECORD. This record, which is shown in detail in Fig. 7, scarcely needs explanation.





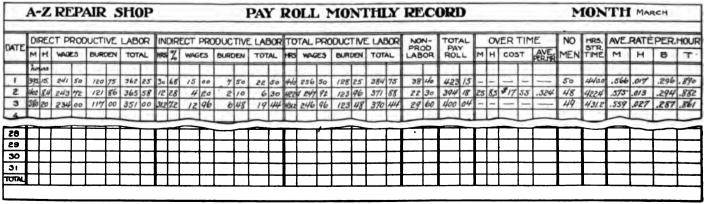
The figures and headings should make it clear. However, a few words about it may not be out of place.

The hours straight time are the sum of the hours occupied by both mechanics and helpers (M. and H.) in direct productive labor, and in addition those occupied in indirect productive labor.

The distinction between direct and indirect productive labor is that the former is work for which pay is finally received. while the latter is non-paying but necessary. The former is any repair work on a motor, for example, while the latter is exemplified in the work necessary to repair a broken lathe.

The per cent. sign indicates the proportion of hours of indirect productive labor to the total hours straight time.

This system, which has been in use only little more than half a year, replaced a very unsatisfactory system. Now that it is established it is proving not only reliable and satisfactory, but also helped to make the business profitable, while formerly it was conducted at a loss.



said to characterize the industry. Manu-

#### THE HORSELESS AGE

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E. P. Ingersoll, Publisher.

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#### Car Maintenance from the Manufacturer's Standpoint.

The problems of maintenance and repair affect the automobile manufacturer no less than they do the user. Manufacturers now realize that continued success depends upon their cars making a good record in respect to low up-keep cost. Very few users know how much thought and money has been expended to give each part of their car's complex mechanism the proper size and shape to withstand the constant shocks of use and abuse, and to give to each wearing surface such an amount and texture of surface and such reliable lubrication that its deterioration shall be as low as possible, considering the permissible weight and the price at which the car is to be sold.

But, in spite of the wonderful results obtained, automobile parts do break and do wear out, and the problem of apportioning this expense in strict justice between manufacturer and purchaser is not simple. In the early days of the industry there was a more or less well founded suspicion that some manufacturers were more concerned with the quantity of their output than with its quality, and that they figured upon a larger profit from repairs than from initial sales. Such an attitude cannot now be

facturers, as a rule, are very anxious that repairs on their cars shall be low, the buying public now knowing that maintenance, repairs and depreciation, rather than first cost, constitute the real expense of automobiling. Manufacturers all recognize their responsibility for proper material and workmanship in their cars, and, while the wording of their guarantee does not include defective design, very few make more than a nominal charge for a part which soon develops a consistently bad record for wear or breakage. Results obtained from tests of materials under alternating stresses indicate that, theoretically at least, any part subject to recurrent stresses will break sooner or later, although, if a sufficient factor of safety is allowed, the life of the part may be made practically infinite. This raises the question of when the manufacturer's responsibility for the endurance of the parts of his chassis ceases. Is a part which breaks in normal service proven non-defective in material or design by the fact that it has run sixty days, six months, a year, two years? The only correct answer is the general mortality record of that part. If breakage is common the inference is that the part has not the requisite endurance, while a record of few failures would throw the blame upon abnormal strains, for which the user rather than the manufacturer is responsible. The user naturally dislikes to assume the expense of repairs, and often is honestly unable to see that the failure of some part while the car was running slowly over good roads was really the result of some overstrain which occurred perhaps months before. It is characteristic of broken parts sent back to the factory as defective that a clean, uniform break is rarely shown. Generally a darkened area shows where the initial crack started under some heavy shock, and once started complete fracture was ultimately inevitable, although it was possibly long delayed.

Where interests clash, as in this case, there is sure to be more or less friction, and while there may still be a disposition on the part of some manufacturers to evade the full measure of their responsibility, on the other hand the manufacturer must be on his guard against more or less unscrupulous attempts to saddle upon him costs which should be borne by the owner of the car. One manufacturer recently expressed the opinion that it would be a good thing for the industry if no guarantee were given, the owner paying for all repairs.

This policy would, no doubt, be satisfactory to those makers whose reputations are already established, and probably the purchaser of a car having an established record for durability would fare fully as well as under the guarantee system, but it would be very hard for a new manufacturer to establish a business.

At the other extreme are those makers who guarantee their cars against any defect developing in workmanship or material during its life. This policy can be safely adopted where a car has been built without material changes in design for a number of years, the normal life of each part pretty well established and weaknesses eliminated. In the last analysis both the life guarantee and the no guarantee plan are simply expressions of confidence in their car on the part of the makers.

Maintenance of cars on contract is obviously outside the field of the manufacturers, but when properly carried out by the local sales agent has the undoubted advantage of establishing a basis for comparison of maintenance costs in either private or public garages, and is also of value as a guarantee to the hesitating buyer that running costs (barring accidents, which may be covered by insurance) need not exceed a certain known amount. The agent's position in the matter insures the contract price being placed as low as practicable, for the sake of its influence upon sales.

The problem of the car that will go is solved. That of the future is to reduce the cost of keeping it going.

#### The Sales Situation.

Probably never in the history of the automobile industry were new companies for the manufacture of moderate priced machines being formed as rapidly as today. Although the market for these vehicles is very large, it would seem that if the present rage for promotion continues very long it will be fully supplied in a few seasons at most. But at the present time there is no dearth of people who are willing to buy, and the problem of the manufacturer is how to reach them. In the present state of the trade the only effective way to do this is apparently through local agents. Although many new agents are coming into the field, it seems that the industry has grown so enormously during the past few months that those companies who get their 1910 models on the market first will get the best both of the experienced agents and of the new comers. There is keen competition this season among agents to secure territory for the sale of a few of the better known and more popular machines, but the large increase in the number of agents for these makes it evident that the supply of experienced men will soon be exhausted.

Few who have not looked at the agency maps of some of the larger companies realize what a big market this country offers, and how imperfectly the field has been covered up to the present time. But after this season conditions are likely to be different, for if the various companies carry out the programs they have outlined they will have agents and sub-agents in nearly every place of importance.

Owing to this rapid expansion it is most important for new comers in the field to get in touch with possible agents in every way they can. While they can get plenty of people who are willing to try to sell their cars, the experienced, proven men and the likely new comers, the "live ones" in other words, are rapidly forming connections, and the later entrants to the field of manufacture, unless very familiar with the trade, are likely to get inferior men to sell their product; and find themselves fatally handicapped in the very department where a business is often made or broken.

The sales battle this season is rather to secure the proper local representatives than to reach individual buyers, and the need of the right kind of trade publicity is probably more acute than it ever was before and possibly than it will ever be again.

#### The Disappearance of the Siren.

During the past few years there have been repeated cases of automobile accessories being placed upon the market and disappearing again after a brief period of popularity, either because they served no real purpose or because they were designed to remedy some defect in construction that was eliminated in later models. One of the devices that have almost completely vanished is the siren, and we venture to say that the disappearance of no other article of equipment from the catalogues of supply houses has been the cause of so little regret among conservative motorists. Of course the siren never enjoyed any great popularity. It originally came to us from France (that is to say, as an automobile signalling device), and was adopted here by a few owners of fast cars, for whom the old fashioned "squawker" would not clear the road fast enough, or who enjoyed the sight of nervous people in horse

vehicles bobbing up from their seats when aroused by the howl of the siren.

Probably a number of causes combined led to the discarding of this offensive signal. It may have been a toy of which the owners soon grew tired, and the unpopularity achieved by the users in their own neighborhoods may have been another reason that prompted them to give it up. In some districts the use of the siren on automobiles was forbidden by law. It is also possible that the continued missionary work of automobile clubs among their members, urging them to treat other road users with due consideration, had the further effect of rendering the siren unpopular.

Not only is the tone of the siren very offensive to practically all who hear it, but the misuse of the device by arrogant youths at one time caused a great deal of bad feeling against motorists, and we may therefore be thankful that the siren is seldom heard on our highways now.

## The Economic Aspect of Auto Touring.

A great deal of money is spent each year by automobile tourists along the touring highways and in the better class of resorts, and in recent years the question of attracting auto tourist trade has been given special consideration, not only by those who cater directly to the needs of the tourists but even by municipal and State authorities. The reports in the metropolitan papers of the arrivals of auto tourists at different cities give a fair idea of the extent of the auto tourist trade, and the impression thus gained may be confirmed by personal observation at the leading hotels in the larger cities along the most popular routes, where touring parties may be seen arriving every evening during the season.

There has been some speculation recently as to the actual extent of touring, and the amount of money placed in circulation by it. It is impossible, however, to arrive at any definite figures. It is well known that on the whole auto tourists are liberal spenders. As a rule they patronize the best hotels, and in addition spend considerable money for gasoline, oil, minor repairs and garaging. We believe that the average amount spent per tourist per day en route does not fall far short of \$5. This, of course, does not cover the entire cost of touring, but only the expenses on the road. When it is considered that there are now 200,000 cars in use in this country, of

which probably more than one-half are used for either short or long tours in the course of a year, it may readily be seen that a great deal of money is scattered annually along the path by auto tourists. In the State of New Jersey between 3,500 and 4,000 non-resident licenses have been issued since the new law went into effect a few months ago. This license gives the holder the right to stay in the State eight days during a year. If we assume that on the average tourists stay in the State only four days a year, that the average number of occupants of a car is four, and that the average road expense per tourist is \$5 per day, non-resident automobile tourists carry something like \$300,-000 into New Jersey annually. It will be noted that the assumptions made are of a rather conservative nature.

Along the main highway of tourist travel, as between New York and Buffalo and between New York and Boston, the business opportunities afforded by the tourist traffic have not been neglected. These routes are placarded with the signs of hotels, garages and repair shops, and some of the garage owners have solicitors at the hotels where tourists stop, soliciting their patronage upon arrival. In the hotel lobbies also are often displayed signs and notices which afford evidence that the management caters especially to auto tourists.

The question naturally arises, What determines the itinerary of the average tourist, and how can tourists be influenced to patronize a particular section? The factors which are considered in selecting the route for a tour are quite numerous, including natural scenery, good roads, hotel accommodations, legal requirements and historical associations. Good roads are probably one of the most important factors, and a community which wishes to attract auto tourists should therefore first of all look to its roads.

#### Coming Events.

August 31 or September 30—Milwaukee (Wis.) Annual Orphans' Outing, Milwaukee A. C. September 6-11—Lowell (Mass.) Annual Motor Carnival, Lowell A. C.

September 15—Denver (Col.) Start of Flag-to-Flag Race to Mexico City, Denver M. C.

October 7—Philadelphia (Pa.) Second Annual 200 Mile Stock Chassis Race in Fairmount Park, Quaker City M. C.

November 6 to 13—National Automobile Show under the auspices of the N. A. A. M. at Atlanta,

December 29-30-Philadelphia (Pa.) Annual Midwinter Endurance Contest Quaker City M. C.

December 31 to January 7—New York City Annual Show, Grand Central Palace, American Motor Car Manufacturers' Association.

#### The Taxicab Business in Boston and Vicinity.

By H. H. Brown.

There are two large companies operating taxicabs in Boston, each operating approximately seventy-five machines. Besides these, there is one concern operating about ten machines, and another concern, which for some time past has done a regular renting business, which has fitted taximeters to one or two of its machines, and operates them under automobile rates or by meter, according to the option of the customer. Both of the larger companies have been in operation about a year.

The Armstrong Transfer Company operate eleven motor cabs at hack rates. These are mostly made with a drop seat at the side of the driver and an extension trunk rack, so that quite a large trunk can be easily carried, loaded and unloaded. This company insist that their drivers be old hack drivers of considerable experience; in fact, about all the men at present employed by this firm driving motor cabs formerly drove their horse cabs.

THE TAXI MOTOR CAB COMPANY
has its offices and garage at the Motor
Mart. The concern has been in business about a year, and operates in all about
seventy-five Thomas cabs. There are a
number of stands operated in different parts
of the city, and machines may also be ordered by telephone direct from the headquarters.

Pneumatic tires are used, of several difierent makes, but the company has no maintenance contract on them. Quick detachable rims are used, and on one or two machines demountable rims. In all other cases Stepney spare wheels are used.

The rates are 30 cents for the first half mile, 10 cents for each succeeding quarter mile, and 10 cents for each six minutes of waiting. For three or more passengers in that portion of the city below Massachusetts avenue the rates are 30 cents first third mile and 10 cents for each succeeding sixth of a mile. Also 10 cents for each six minutes of waiting. The first schedule is known as Tariff 1 and the second as Tariff 2. On the machines of this company taximeters of foreign manufacture are used, which are driven from the rear wheels.

The average daily mileage of the cabs in actual use is rather hard to obtain, but it probably varies between thirty and sixty, including both paying and no-paying miles. The drivers are paid a commission.

THE TAXI SERVICES COMPANY, with offices and principal stand at the Hotel Lenox and a garage at 12 Harcourt street, own seventy-five Berliet cabs, fifty of which are operated in Boston and the remainder in Providence, R. I. The company have been in operation a little over a year, and have from time to time increased the number of cabs in service. They expect shortly to be operating a total of 100 cabs.

This company have upward of a half dozen regular stands located at hotels and railway

stations around the city, and cabs may also be ordered by telephone at their main office. The machines are equipped with Goodyear quick detachable tires and rims. The company has a tire maintenance contract with the Goodyear company based on the mileage shown by the meters. The Goodyear company employ two men, whose entire time is given to looking after the tires. Formerly spare wheels were used on the cabs, but now each cab is provided with inner tubes, a spare tire and an air bottle.

The rates by taximeter are the regular legal rates, known as Tariffs 1 and 2. Upon the advent of the taxicab in Boston there were a number of firms who were well established in the renting business, and who were doing a good business at \$5 per hour. As the average speed of a touring car is considerably over 15 miles per hour, it will be seen that for long trips touring cars can be hired by the hour at this rate much cheaper than a cab by meter. It will be seen, moreover, that in trips of this description, that is, of one hour or more, the number of idle miles and time lost is much less than would be the case in a number of short city trips covering the same pay mileage. This company, in order to secure this class of trade, have made a rate of \$5 per hour for the first hour and \$4 for each succeeding hour, and of \$25 per day for a ten hour day and \$30 for a twelve hour day. The company also stand ready to make a special monthly rate for carriages for private use. They have this summer placed one or two cabs at some of the summer resort garages along the north shore, special rates being made with the hotel proprietors for the garaging of the machines. The taximeters are of American make, and are driven from the front wheels.

Repairs are made in the garage of the company, and on the average from twenty to twenty-five men are on the garage payroll, ten to twelve being employed in the repair shop and the rest in the garage, washing and polishing. About five machines, or about 10 per cent. of the total number, are constantly undergoing some form of repair. The manufacturers furnish all parts free for the first year. It is estimated that the depreciation, including repairs and replacements, is about 33½ per cent. per year.

When the company first started in business drivers were paid entirely on a commission basis. After an extended trial of this system it was abandoned and drivers were put on a strictly salary basis.

It was found that under the commission system the drivers, knowing they were paid by the mile, tried to cover as many miles as possible in a given time. This led to speeding, trouble with the police, and also to not a few smashups, besides excessive wear and tear on the tires and the machines. Besides this, it tended to render the service

unsatisfactory to patrons, who could not be convinced that the longest way round was the shortest way home, provided that you traveled fast enough. Hence the present salary basis. The schedule of hours now in force calls for a day of twelve hours, the first men coming on in the morning at 7, and five men coming on each hour after that till I o'clock in the afternoon. At 7 p. m. three men come on, and are on till 7 o'clock the next morning. These are old, experienced men, and are kept in reserve to answer night calls. It has been found that during the winter the busiest hours are from 2 to 6 o'clock p. m., and from 7 till 12 in the evening, the evening work being mostly theatre work. During the summer months, however, the busiest time is from 7:30 a. m. till noon, and from 7 o'clock p. m. till midnight.

The business of the taxicab companies and of the smaller concerns operating taxicabs is watched with a good deal of interest by the management of concerns operating horse driven cabs, and also by the hack drivers themselves. It would probably surprise a good many people to learn how closely the details of the business have been observed by men who are by most people thought to be all but illiterate, and what intelligent thought they have given the matter. For instance, the drivers claim that the bulk of the business of the taxicabs is from a class of customers who were at no time patrons of the horse driven cab. This, it is claimed, is largely due to the fact that the tariff is little, if any, greaterfor the full capacity of the cab than for one or two. Then, again, the minimum charges are much less than the regular legal hack rates. For instance, the lowest charge for hack fares is 50 cents for one person. The lowest charge for two persons by taximeter is 30 cents. This is for one-half a mile. As there are many residences within this distance of the Back Bay stations, many of them occupied by people in moderate circumstances, and as the car connections to the depot in this district are poor, it may easily be seen why the taxicab appeals to this class, especially when they are encumbered by hand baggage.

On the other hand, these short hauls leave a very low margin of profit as compared with the longer hauls, for the following reasons: No charge is made for sending a taxi to a call for distances of less than one mile, and there is no charge for returning from a job if the return distance is less than 2 miles. Under some circumstances the cabs must therefore cover 21/2 "non-pay" or "dead" miles to one pay mile. Under a tariff of 50 cents for the first mile the company would receive only 50 cents for an actual distance of 31/2 miles, or at the rate of 14 cents per mile. Counting 7 miles to the gallon of fuel, 3 cents per mile for tires, and driver's wages at \$15 per week, it will be seen that the amount left for wear and tear is not very large.

On the other hand, for shopping trips the hack rates are \$1.50 per hour. Take,

for instance, the case of two persons going We will say that the distance shopping. traversed is 3 miles. This would probably take by cab twenty-one minutes, leaving thirty-nine for waiting. This would cost \$1.50 for cab. By taxi the 2 miles would figure out to 90 cents, and the waiting as seven 6 minute periods, which would amount to 70 cents, bringing our total to \$1.60. Let us, however, consider that most of the time is taken up driving. With only two 6 minute stops we may expect the horse drawn vehicle to easily cover 6 miles. This would cost us by taxicab 20 cents for stops and \$2.50 for mileage, making a total of \$2.70 as against \$1.50. On the other hand, twenty-four minutes' time would be saved by the use of the taxicab, which would be a considerable advantage under certain circumstances.

#### SAUNDERS & BUTLER,

who have for a number of years run a successful renting business, fitted taximeters to a number of their machines as an experiment. This concern have no stands, their business being conducted wholly by telephone calls to their office. Their experience was that on account of the low minimum charges they lost money on these smaller trips, and that owing to the excessive cost on long trips their customers much preferred to hire by the hour or day. or in certain cases by the job, as in taking people to their destination for sums agreed upon. They found, however, that indirectly the taximeter paid them, since new customers hired their cars under taxicab rates and then became regular customers. Their machines not being built on regular taxicab lines, are not recognized as such when the taximeter is covered with a hood.

The opinion seems to be quite prevalent that the minimum charges under the taxicab tariff are too low, and that the charges for long distances are excessive.

#### WORCESTER SERVICE.

A rather interesting compromise between the taxicab tariff and hack rates is that of the Taxicab Service Company, of Worcester, Mass. This company have at present in operation six Sultan taxicabs and two touring cars. The office of the company is in the Franklin Square Garage, and their cars are garaged there under special arrangement with the proprietors. The cars are equipped with Stepney spare wheels.

Owing to the small number of cabs in operation the company have thus far not been able to obtain a tire maintenance contract.

It has been found that the average daily mileage of the machines is about 50, with the pay miles 30 to 35.

Strange to say, the gasoline consumption is as low as 1 gallon to 16 miles. Drivers are on a straight salary basis, the salary varying slightly. They are on duty as follows: Three from 7 a. m. to 7 p. m.; one from 2 p. m. to 2 a. m., and one from 7 p. m. to 7 a. m.

These machines are not fitted with taximeters but with speedometers with at-

tached odometers. The rates charged for a single passenger are as follows: One half mile, 30 cents; one mile, 40 cents; 2 miles, 80 cents. Fifty per cent. is added to the above rates for each additional passenger. Ten cents is charged for six minutes of waiting.

Calling and shopping trips are:

Two. Four.

1 mile circle of city hall, as per map. \$2.00

1 mile circle of city hall, as per map 3.00

4.00

Distances within the one mile circle may be as much as 11/2 miles, and then some time must be wasted waiting for the performance to come to an end and holding the car in readiness, so that these rates are not as high as might at first appear. Cars are furnished for business men's trips at the rate of \$3 per hour and for touring at \$4 for the first hour and \$3 for each additional hour, or \$25 per day of ten hours. This concern is practically a closed corporation, and the manager is also a stockholder and exercises very close personal supervision over the business. Drivers are forbidden to exceed 15 miles per hour under ordinary circumstances. drivers are required to serve certain time gratis in the repair shop before they are employed to drive. Thus they are made familiar with their cars, which proves helpful in case of a minor breakdown. One man is employed as repair man exclusively, and thus far no car has ever failed in service. The company started business on March 1, 1908.

## Expansion of Oakland Motor Car Company's Plant.

The Oakland Motor Car Company, of Pontiac, Mich., has acquired the property of the Pontiac Buggy Company, and will at once erect a number of additional buildings to give it a capacity of 12,000 cars a year. The plant when completed will have about 700,000 square feet of floor space and occupy 12 acres. Among the new buildings to be erected is a four story structure, 72x 140 feet, which will join the main Oakland plant and will be L shaped. There will also be a one story building built for assembling purposes, 60x200 feet. This will have a saw tooth, glass top roof. An extension will be built on the test house, to be 60x75 feet and two stories in height. Another building, 80x 160, four stories, will be built, which will be used for the assembly of the new Oakland models.

In addition to the Oakland "Forty" touring car, of which it is planned to turn out 3,000 during the next year, the company is bringing out a "Thirty" model, after designs of A. P. Brush, to sell at \$1,250. The car is equipped with a four cylinder, 4x4 inch motor, selective type change gear, multiple disc clutch, shaft drive, I beam front axle, 32x3½ inch tires, and magneto. This model will be made in both runabout and

touring car types, and will be essentially a smaller edition of the Oakland "Forty." It is planned to produce 6,000 of these cars next year, half of them runabouts and half of them touring cars.

The improvements in the "Forty" model for 1910 are of a minor nature. Among them might be mentioned a mahogany dash, which takes the place of the shroud (on the touring car); brake drums of larger diameter (14 inch); an oil tank integral with the crank case; tonneau doors with metal panels and aluminum molding; the accelerator pedal located betwen the clutch and brake pedal; a sight feed on the oil pump and a 2 gallon reserve compartment in the gasoline tank.

#### A. L. A. M. Standard Taps and Dies.

It was to be expected that after the standardization of fine screw threads for automobile work by the Mechanical Branch of the A. L. A. M., tap and die makers would take up the standard and market taps and dies to cut these threads. The American Cap and Die Company, of Greenfield, Mass., in their new catalogue list two sets of automobile screw plates for use in factories, repair shops, etc. The smaller set, known as No. 25, comprises 1½ inch dies with taps, stock and wrench, for cutting from ½-28 to ½-20 threads. The larger set, No. 35, cuts eleven sizes, from ½-28 to 1-14.

## Bowser Company Building New Factory.

F. S. Bowser & Co., Inc., of Fort Wayne, Ind., manufacturers of gasoline and oil storage apparatus, have recently been forced to make arrangements for additional factory space. In their Fort Wayne plant they had up to the first of the year 65,000 square feet of floor space, and contracts have recently been let for new buildings which will double this. The company will install 320 horse power of gasoline engines and a producer gas plant from which to supply the engines. It is stated that the company is working to its capacity.

#### Long Drive in an Electric.

A report of a long drive in an electric on a single battery charge comes from Boston. Col. E. W. Bailey, of Amesbury, Mass., recently drove one of the cars made by his company from Park square, Boston, to Providence, R. I., and back, a distance of 104 miles, and it is estimated that at the completion of the trip there was still enough energy left in the batteries to propel the car another 30 miles.

#### A Correction.

In glancing over Table I in my article on runabouts, on page 149 of the issue of August 11, 1909, I notice that the stroke of the Brush motor is given as 4 inches. This dimension was taken from a catalogue issued early this season, and the stroke has since been increased to 4½ inches.—F. E. WATTS.

# The Wider Dissemination of Professional Knowledge and Experience.

(Paper read by Henry Hess before the Society of Automobile Engineers at Chicago-Condensed.)

There is probably no professional or business man, teacher or student that has not felt the desirability, or rather the need, of preserving for future use that knowledge and recorded experience brought him by the professional journals. Much of this is later made available in books and works of reference, but those, by their very nature, must lag behind and must sacrifice much to condensation.

Out of this need have arisen many methods and systems of arranging and filing information beyond the storage ability of memory.

The inadequacy of all previous methods led a former director of the New York State Library, Melvil Dewey, to devise a new arrangement. He divided all knowledge into a series of broad classes, assigning each a number, o to 9. Each of these broad classes was again sub-divided and each such sub-division again assigned one of the numbers from o to 9.

It is apparent that this sub-division can be carried on indefinitely. For purposes of convenience a dividing period is placed after each third figure. This looks formidable in the description, but is really exceedingly simple.

One engineer will be interested in many lines, will accumulate matter along all of these, the greater part naturally relating to his specialty. He will mark each note preserved with its Dewey number. Matter in chemistry will be 540. Matter on steam engineering will be found under 621.1. In the last line he is apt to accumulate sufficient matter to make further sub-division advisable. He does that by adding figure 1; 621.11 means mechanism of the steam engine—design of engine parts. Adding 2 instead gives 621.12-marine engines and ship propulsion. As our engineer is interested also in transportation he finds that is assigned number 656; accumulating notes in quantity on this general subject further, classification by number extension gives 656.2 for transportation by railways; 656.3 for transportation by horseless vehicles, etc., while 656.32 refers to automobiles. Further sub-division goes on as far as detail sub-division may become desirable, without any change, merely by hanging on additional numbers.

All matter is filed away in numerical order. In that way our engineer wishing to consult his accumulation on chemistry need go to only one place, indicated by 540. Should he wish to refresh himself on transportation by means of automobiles, he will not have to wade through his whole accumulation on transportation under 656, but will find in its numerical order and consult only everything numbered 656.32. When through he, or anybody for him capable of reading numbers, can put everything quickly back in its numerical place. Similarly an instruction

to the office boy to pick out the complete bunch under 656.32 will bring to hand all notes on this subject. Under any other known method a fairly well trained and high order of intelligence would have to be called on to bring all of this matter to hand.

But it is necessary to know the classification number for any given subject. A so called "relative index" is used. That is an alphabetical index with the classification number given. At first sight this seems to lead back again to the alphabetical index from which escape was sought. Not so, however. There is never any difficulty in finding the broad subject under some name or other that will come to mind naturally to anyone, even superficially familiar with that subject. The index number itself then gives the clue to detail classifications, by looking up these in the "numerical extension."

Dewey started this work for his needs as a public librarian; it was extended by other librarians; a further extension to the engineering industries was made by Breckenridge and Goodenough and published by the University of Illinois. (Application to the university will bring a copy.)

One great advantage of this Dewey system is thus illustrated by the way it permits of continued extension to take in more and more detail by building onto previous work and without need for change of the previous work. At the conclusion of this paper there is presented an extension to cover the field of the automobile, this extension beginning where Breckenridge and Goodenough left off and extending their classification without break into this field and in greater detail.

Anyone interested in any specific detail in this field can carry his classification still further, building on by extension where this leaves off.

This brings me to the title of this paper, a matter that I have long advocated in a general way and that I believe would greatly benefit every engineer in every possible field; nay, more than that, would benefit every human being seeking to profit by the accumulated experience of mankind as laid down in print.

While the individual can classify his own accumulations by this Dewey method, he can benefit by the accumulation of others only when their accumulations also are indexed, not merely by the same system in general but under the same numbers. Partly this is the case today, since a number of libraries, universities and colleges have adopted the same index.

The full realization of possible ultimate benefits can be had only by co-operation. The base for such co-operation is best laid in the various professional societies. Let us take our own Society of Automobile Engineers. Say that the task of extension of the index to our direct field beyond the limits of the index appended to this paper be assigned a committee. To each member would be assigned some one subject. Say, one to extend 656.322, motive powers; another 656.323, principal parts, etc. The work is not difficult. In getting up the appended index extension, cuttings, notes, etc., as they accumulated were given the main number 656.32. As these accumulated they were from time to time assorted into more detailed groups and an extension number assigned each group. The appended extension is thus the growth of several years; the work involved was not more than a couple of hours per month. The actual work is very simple, since no logical arrangement is needed in the assignment of numbers; in fact, it is desirable to get away from any idea of logical sequence or relationship of subject as reflected in the numbers; what might appear as a very logical arrangement to one person would be not at all so to another that approached the matter from a different angle. There could. therefore, never be any wide agreement on any basis of logical sequence. Let it once be recognized that the numbers of the classification are mere location numbers and this difficulty disappears.

The committee would each six months submit its extension, and this be examined by the chairman to avoid any possible overlapping. The extension would then be recommended for general use and be made available through our publications.

The next step would be the co-operation of the various engineering societies, each taking up a special division most in accord with its field. That would avoid duplication of effort, overlapping and confusion. Each society would suggest to its members the advisability of using the index for their individual accumulations. Each would further suggest to its members that they bequeath their accumulations to the society. In this way there would gradually come to each society a great body of fully and uniformly indexed, and, therefore, immediately available, material. As it is now, such bequests are more often a source of embarrassment than anything else, since the work of reindexing is quite beyond the capacity of any society's library staff. Most of such bequests, therefore, find their way into the storerooms, there to accumulate dust. excepting, possibly, an occasional volume or two, valuable simply for its rarity. The far more useful, because live, material cannot be used. On the other hand, did that come in, properly indexed under the adopted classification, it could at once be placed on the shelves in its proper place. Naturally much of such matter would be duplicated. That would not be a detriment; on the contrary it would open up an additional and very wide field of usefulness. As it is now, the library of any of the societies, small or large, is available only to the relatively few able to actually visit it and spend time and make notes in the library's rooms during

library hours. Those most in need of the library have, therefore, the least opportunity to avail themselves of it. But with the accumulation of duplicate matter, resulting from the suggested plan, it would be desirable to keep on the permanent shelves only one copy. All of the balance would be available for lending out. Say that some member of our society, or of a society exchanging privileges with ours, wants to inform himself fully on the subject of carburetors for internal combustion motors. Writing to the society would bring in return one of the duplicate sets of everything under number 656.322.11, and at no cost to him beyond that of expressage both ways and involving no obligation beyond return by a prescribed time. Even the loss of a part of this matter would not be very serious, as its duplicate would be on the permanent shelves.

There are among the members of this society several who are interested in the editing and publishing of technical papers. These papers publish an annual index of contents. In that the headings under which articles appear are readily found, as the arrangement is alphabetical. But such headings altogether too frequently indicate anything but the important part of their subject matter. It is by no means so rare as it should be to find a good note on a carburetor, f. i., headed "Jones Latest Improvement."

No doubt at the time many were likely to associate Jones intimately with carburetors, but would it occur to them to look up such a heading in the index when searching for carburetor matter?

Now let the editor use that title if he likes it, but let him follow it with a numerical index 656.322.11. The annual index would then be marked "Carburetors 656.322.11, pp. 52, 79, 120, etc. That would guide every reader who preserved his numbers immediately to everything on carburetors in that volume. But the editor will ask why the number, why not simply the page? We do not all preserve the papers we get; some of us preserve one or two of our particular favorites. It is the habit of many to mark an article that appears to be of real interest and to cut that out for preservation. If the index reference number is printed at the head such cutting may be at once filed in proper sequence with others on the same subject. It is probable that with time the paper following this plan and bringing matter worth preserving will secure sufficient additional subscriptions to pay for the cost many times over. The actual work would not use up two hours per week of an assistant editor's time for any publication now in the field. Any editor, sure that all of his matter is worth preservation, may guard against partial loss, through filing of one article that is on the same page with another on a different subject, by either printing on one side of his paper only, suggesting the subscription to two copies instead of one, or printing advertising matter on the rear side of

each page. Both the latter suggestions will meet with the approval of the business manager; the last will supply additional arguments to the advertising solicitors for space and for the raising of the rates.

No very vivid imagination is needed to foresee the tremendous benefit that would result could the knowledge recorded in the world's professional journalism be placed freely at the disposal of all.

The plan outlined, adopted by professional societies and journals, would shorten greatly the road to the goal of "the wider dissemination of professional knowledge and experience."

AN EXTENSION OF THE DEWEY DECIMAL SYSTEM OF CLASSIFICATION TO AUTOMOBILES.

#### By HENRY HESS.

This is an extension of the classification applied to engineering industries by L. P. Breckenridge and S. A. Goodenough, as published by the University of Illinois, Bulletin, Vol. IV, November 1, 1906, No. 5, Part 1.

In the Breckenridge and Goodenough index the following numbers are assigned.

656. Transportation. Operation of Railways. Transportation, by Horseless Vehicles. Automobiles.

.321 Types.

Motive Powers. .322

.323 Principal Parts (Running Gear, Motors, Transmitting Gear, Braking Devices). Design and Construction.

Starting with these classifications, the following extensions have been made and have now been used in the classification and filing of automobile matter accumulated during the last three years. During this time the index has been gradually extended to adequately take in all matter that seemed to have any claim to preservation.

Not the least advantage of the Dewey system is the readiness with which it lends itself to this work without any serious drain on the time of a busy man. The classification so far as extended to date is given in the following pages:

```
656.32
             Automobiles.
             General works, books, records, statistics, formulæ—too broad for more
   .320
                detailed classification.
             Types.
   .321
       .0
             General works, books, records, statis-
               tics, formulæ-too broad for more
               detailed classification.
             Pleasure Vehicles.
             General.
       .10
       .11
       .12
       .13
             Bicycles, Tricycles.
       .15
             Commercial Vehicles.
       .20
       .22
       .23
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Bicycles, Tricycles. .25 Agricultural Vehicles. General. .4 ٠5

٠Q 656.322

.24

.8

General works, books, records, statistics, formulæ-too broad for more detailed classification.

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656.322.1 Internal combustion, explosive, gas,
              gasoline, alcohol, oil, petroleum, pe-
             troleum residue.
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If not specifically for one of .ar Four cycle. these use no let-Two cycle. ter. D may be Other than four or used with a b or two cycle. c as the case may Air cooled. be. No letter Turbine. means water coeled.

General works, books, records, statistics, formulæ, test apparatus-too broad for more detailed classification. Carburation, carburetors, fuel, fuel

supply. Cooling radiators, fans, pumps.

Cylinders, pistons, connecting rods, flywheels, crank shaft.

Valve mechanism.

Ignition.

.16 Mufflers, exhaust parts beyond valve.

.17 Fabrication, manufacture.

Specific motors-detailed description of.

Miscellaneous, self starters. .19

656.322.2 Steam motors (main classification analogous to .322.1 above).

General works, books, records, statistics, formulæ, test apparatus—too broad for more detailed classification.

Steam generators, boilers.

Cooling, radiators, fans, condensers Cylinders, pistons, connection rods, flywheels, crank shaft.

Valve mechanism. .24

.26 .27

Fabrication, manufacture.

Specific motors-detailed description of. .28 .20

Miscellaneous.

Electric motors (main classification an-656.322.3 alogous to .322.1 above).

General works, books, records, statistics, formulæ, test apparatus-too broad for more detailed classification.

Cooling fans.

.32 .33 .34 .35 .36

-37

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656.322.4

Fabrication, manufacture.

Specific motors-general description of.

Miscellaneous. . 39

·7 .8 ٠, Principal parts (excluding those be-656.323 longing to the motive power, for

which see .322). General works, books, records, statistics, formulæ, test apparatus, lubrication, screws, bolts, connection-too broad for more detailed classification.

Frame, springs, suspensions, shock absorbers, buffers, torque rods.

Clutches, brakes.

Change gears, friction gear; belt gear,

chain gear, hydraulic gear.

Axles, front and rear, differential, bevel drive.

Wheels, rims, tires. .6

Steering gear. ٠7

Miscellaneous, universal joints. 656.324 Design and construction-general.

Testing apparatus, .325

.326 Body.

.327 Materials.

General works, books, records, statistics, formula—too broad for more detailed classification.

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coming under .327.7 below.		Fabrication, Motor and Parts, Electric.	.322.37
.2		Fabrication, Motor and Parts, Explosive.	
-3		Fabrication, Motor and Parts, General.	
-4		Fabrication, Motor and Parts, Steam	
٠5		Fans, Cooling, for Electric Motor	
.6		Fans, Cooling, for Explosive Motor	
.7 Accessory to automobile man		Fans, Cooling, for Steam Motor	
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.8		Flywheels for Steam Motors	
-9		Frames for Chassis	
.328 Minor accessories.	_	Freezing Mixture, Auto	-
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#### To Sell Haynes Cars in Missouri.

The Haynes Automobile Company of Missouri has been organized at St. Louis to handle the Haynes car. The members of the firm are F. W. Niedermeyer, H. B. Kline and H. M. Paine. The company is to be incorporated, and will shortly open a sales office and garage on St. Louis Auto Row. A selling branch will be established at Columbia, Mo., under the management of Niedermeyer & Kline. The company holds the Haynes agency for eastern Missouri, and has placed orders for fifty cars. Temporary headquarters have been established at the Delmar Garage, 5430 Delmar avenue.

#### Automobile Motor Business Good.

Thomas J. Neacy, president of the Filer & Stowell Company, Milwaukee, Wis.. owner of the Beaver Manufacturing Company, speaking of trade conditions, said: "The Beaver works have a full year's work ahead. The output for the year ending October I will be 50 per cent. greater than for the year preceding. New equipment is being added to double the capacity for 1910, beginning with October I. The business is practically on a spot cash basis, and not, as before the panic, largely a matter of long credits."

Mitchell Motor Car Company Doubles Capital.

The Mitchell Motor Car Company, of Racine, Wis., has increased its capital stock from \$1,000,000 to \$2,000,000, an amendment having been filed with the Secretary of State last week. The additional issue is simply to keep pace with the growth of the company, it is stated at Racine.

# NEW VEHICLES AND PARTS > >



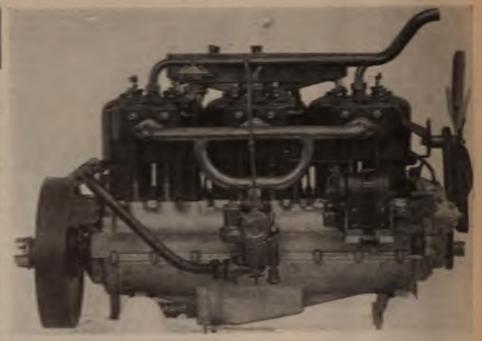
#### Pierce 1910 Models.

During the season of 1910 the Pierre-Arrow Motor Car Company, of Buffalo, N. Y., will confine themselves to the production of six cylinder machines. These will be made of three horse powers, viz., 36, 48 and 64, corresponding closely to this season's six cylinder models. Various refinements and improvements of detail have been introduced, with the result that the three models are now very similar, except in size.

THE THIRTY-SIX BORSE POWER MUREL

The cylinders are cast in pairs, with valves on opposite sides. Formerly the Pierce company used individual cylinders exclusively. The crank shaft is of large size, and, furthermore, is provided with bearings between adjacent cylinders. The bushings are of bronze, with a thin lining of special bearing metal. The connecting rods are thin I section forgings. The valves have cast iron heads, securely fastened to steel stems. The exhaust manifold is provided with two expansion joints, which are put together in such a way as to give an injector action to the outgoing gases.

Lubrication is by the well known Pierce system, giving gravity feed to all bearings from a tank located at the top of the cylinders, this tank being kept full by oil returned from the settling chamber of the crank case by a small gear pump, which is driven by worm gears from the cam shaft. A sight feed on the dash shows the level of oil in the tank. At night this sight feed is illuminated by a small incandescent bulb operated by a push button. The oil passages to the bearings are large, about one-quarter inch in diameter, and as the oil is carefully strained as it is circulated there is little possibility of their clogging. Holes drilled through the crank shaft carry the oil to the pin bearings. The cylinder walls are lubricated with the spray. An oil ring has been added to the bottom of



INLEY SIDE OF SIX CYLINDER MOTOR.

the piston in this year's models, which reduces the consumption of oil.

The hore of the 36 horse power motor has been increased one-sixteenth inch, being now 4 inches, while the stroke remains at 4% inches.

Two complete systems of ignition are used, a Boach magneto and a coil system. This year's coils, however, have six non-vibrating units, and a master vibrator which controls the adjustment for all six cylinders.

The clutch is a leather faced cone, with cork inserts. As in former Pierce models, the leather is secured with hick-ory pegs, which is claimed to prevent the burning sometimes experienced when copper rivets are used. The pedal leverage has been increased on this model, so that less pressure is required to release the clutch.

The change gear is a four speed selective. Gears and shafts are of Krupp chrome-nickel steel. The sliding pinion shaft is square. Large annular ball bearings are used. Control is by a gated lever, which operates ball locked shifting rods. It is interlocked with the clutch. The hand lever is a inches longer, and has slightly less movement than in this year's model.

The propeller shaft has two universal joints. Torque reaction is taken by a trussed rod from the rear axle. The rear axle is of the non-floating type. The shafts are of chrome-nickel, very much larger at the wheel ends than at their inner ends. In this year's cars Timken bearings are used at the wheels, while annular ball bearings are retained at the driving gears. Timken bearings are also used in the front wheels, and made necessary a new set of hub stampings. The wheels, by the way, are made from carefully selected stock, in the Pierce factory, and are said to cost two and a half times as much as those used on some cars selling at the same price. The pivots are



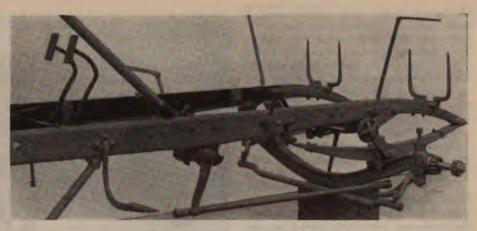
SIX CYLINDER, SIXTY-SIX HORSE POWER PIERCE-ARROW TOURING CAR.

large, especially at their inner

ont axle is an I section forging eversed Elliott type. The webs by heavier than in the preceding defore the axle is placed in the atside is ground with a portable, ing emery wheel, and given a aspection to see that no flaws lited from the forging.

ont springs are semi-elliptic and three-quarter elliptic. On all 36 wer cars, except the runabout, springs have I inch less arch year, so that the body is no a spite of the increased wheel

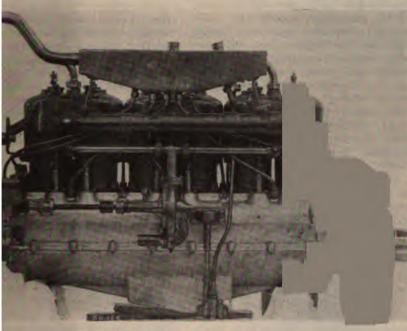
eering wheel has a greater inthan on this season's model. I throttle levers are neater. The ams are one-half inch wider and rger in diameter, and are now



FRONT AXLE AND STEERING GEAR.

For miniature tonneau and runabout: Front, 36x4 inch; rear, 36x4 inch.

The running boards are 2 inches wider



EXHAUST SIDE OF SIX CYLINDER MOTOR.

m pressed steel. The internal e operated by a cam and the exa toggle mechanism. Both sets with Raybestos, three-sixteenth k, which is one-thirty-second cer than this season.

touring car, brougham, landauiniature tonneau, the wheel base
hes, as compared with 119 inches
m. This is due to moving the
forward 3½ inches and lengthbody room 2½ inches. The
are 2½ inches longer, and on
ig body the rear seat is 3 inches
he touring car is a strictly five
machine. Brougham and landies are 6 inches longer inside.
about chassis has a 119 inch
se.

or touring car, brougham and Front, 36x4 inch; rear, 36x41/2

than formerly. The mud guards have been changed slightly, and are provided with a flange seven-eighth inch deep all around. Spencer power air pumps are fitted to all models. They are permanently attached to the underframe, and are gear driven from the water pump shaft. The driving gear slides out of mesh, so the pump is idle except when needed. A gas tank, placed in a rear compartment, is provided for lighting. A gas generator will be fitted only on special order.

Little details are very carefully looked after on all models. Automatic grease cups are fitted on the spring joints. All working parts are bushed. This practice is even extended to brakeshoe pivots, which are bushed with bronze.

THE FORTY-EIGHT HORSE POWER MODEL.

These cars resemble the smaller machines, and have much the same improvements, most of which are common to all three models. The motor is a six cylinder, 4½x4¾ inch, similar to the others except in size. The following changes, however, apply only to this model:

The brake drums are three-sixteenth inch wider, and are made from steel stampings. The wheel base has been increased from 130 to 134½ inches by moving the front axle 4½ inches forward, bringing it under the radiator. This has given room for lowering the frame 2 inches, giving the front springs 2 inches less arch. Three-quarter elliptic springs are used at the rear, in place of the semi-elliptics used last season. The seven passenger touring body has the same



CAST ALUMINUM BODY.

seating room as this season, but has been made somewhat different in design, to harmonize with the dropped frame. Touring, landau and suburban bodies will interchange on the standard 48 and 66 horse power chassis. The chassis for the runabout and miniature tonnean bodies have a wheel base of 128 inches. These bodies will also fit the 66 horse power runabout chassis.

Tires for touring car, landau and suburban: Front, 36x4½ inch; rear, 37x5

For miniature tonneau and runabout: Front, 36x4½ inch; rear, 36x4½ inch.

In the 48 and 66 horse power models the brakeshoe joints are placed on an angle of 45 degrees with the vertical. This brings the connecting rods in such a position that the brakeshoes are not opened and closed by the motion of the vehicle springs.

THE SIXTY-SIX HORSE POWER MODEL

The 1909 model, corresponding to this, was rated at 60 horse power, and had a motor, with individually cast cylinders of 5 inch bore. The new motor is a 5½x5½ inch, six cylinder. The cylinders are cast in pairs, and other details also correspond to the smaller motors. The car embodies the following special changes:

The brake drums are t inch wider than formerly, and made from steel stampings. The wheel base has been increased to 140 inches by bringing the front axle forward 5 inches. Three-quarter elliptic springs have been adopted at the rear. The frame is dropped, and the front springs have t inch less arch, bringing the centre of gravity lower. The chassis for the runabout and miniature tonneau bodies has a wheel base of 133½ inches.

Tires for the touring ear, landau and suburban: Front, 37x5 inch; rear, 38x53/2

Front, 37x5 inch; rear, 37x5 inch.

So many precautions are taken in the manufacture of these cars to secure high quality that only a small proportion of them can be mentioned in the space available. We may note, however, the careful design of forgings, to allow the



EMPIRE "TWENTY," MODEL A.

metal to flow easily and without strain, and the exceedingly careful heat treatment of every steel part, even frames. Each piece is rigidly inspected after every machine operation. Cases are carefully hand scraped on the inside so that no grit remains to get in the oil and cut the bearings. Nearly all nuts are cotter pinned. Hoods are made of sheet copper, which probably deadens motor noises. All bodies are constructed from aluminum castings, even the closed bodies. The cast construction permits of very graceful lines. The upholstery and finish are, of course, high grade, to correspond with the workmanship of the mechanical parts.

# The Empire Twenty.

The Empire Motor Car Company, of Indianapolis, Ind., has placed on the market a 20 horse power, four cylinder model, a car that was designed by experienced men, and is the result of a long term of experimental work. Quite a number of its details are novel, although the general design does not differ widely from that of other makes which have been very successful.

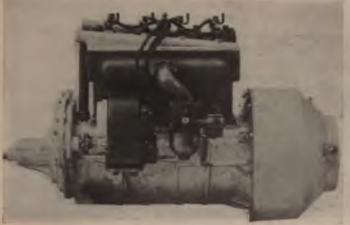
THE MOTOR.

The motor has a bore of 31/2 inches and

a 4 inch stroke. The cylinders are cast together without water passages between The valves are on opposite sides, and operated from two cam shafts. The entire interior surface of the cylinder casting is machined. Cylinder bores, valve pockets and water spaces open to this machined surface. This gives a good support for all the cores. The gas spaces are closed by an air cooled head plate, bolted to the cylinder casting with a McKim gasket between. To the top of the water spaces are bolted two water manifolds. These connect with the top of a McCord radiator. The water returns to the lower end of the jackets at the rear, through long hose connections. This gives a double thermo-siphon circula-

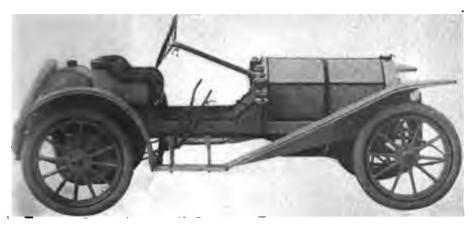
The valves are 134 inch clear diameter with a quarter inch lift; their springs are secured by screw washers, and adjustment is maintained by cap nuts, which contact with the tappets. The latter are cylindrical of large diameter, and slide in bronze guides inserted in the lower flange of the cylinder casting. Their lower ends are rounded and hardened. They are kept from turning by a cross pin.

The cam shafts are the inch in diameter, with t inch diameter bearings and integral





EMPIRE "TWENTY" MOTOR, INTAKE AND EXHAUST SIDES.



EMPIRE "TWENTY," MODEL B.

cams; they have a bearing at each end, with a distance of 12 inches between.

The crank shaft pinion is of steel and the cam shaft gears are of malleable iron. The magneto gear is die cast from a special metal. The crank shaft has two bearings. It is 11/2 inches in diameter; the pin bearings are 11/2 inches long, and the front and rear bearings are 21/2 and 31/2 inches long, respectively. The flywheel is secured to a taper. The crank shaft bushings are of Parsons bronze. The crank case is of aluminum, of the barrel type, open at the top. Large hand holes are provided. The pistons have four diagonally split eccentric rings, three above and one below the pin: the pins are clamped in the rod ends and turn in the piston. The connecting rods are neat drop forgings, 8 inches long, with caps secured by two studs. Their nuts are locked by a sheet steel strip with hexagonal holes, which fit both nuts,

Forged with each rod cap is a thin knifelike blade, between 2 and 3 inches long. These blades dip into deep oil pools in the crank case and throw a spray of oil to all the bearings. The oil pools are refilled from a tank beside the motor by a hand pump. The oiling is practically constant through a considerable change of oil level. A double system of ignition is used, consisting of a Remy magneto and batteries, with one set of plugs above the inlet valves.

# CLUTCH AND CHANGE GEAR.

The clutch is a leather faced cone. It is enclosed in an aluminum case which surrounds the flywheel. To the rear end of this case is bolted a flange which is fast on the forward end of a large diameter steel tube, the rear end of which is fastened to the change gear case in a similar manner.

The drive is by shaft to bevel gears, with a reduction ratio of 1½ to 1. From these gears two speeds and a reverse are obtained by sliding spur gears and a jaw clutch. The spur gears mesh with a pin tooth face gear. The gear is operated by a hand lever and an H quadrant in the conventional manner. The hand lever is mounted just inside the frame. This gear set is enclosed in the case which surrounds the countershaft. The ends of the case are

globular, and are mounted in the forward ends of the chain cases.

#### CHAIN CASES.

The cases are of pressed steel, and also serve as radius rods. The ball joints permit of the axle being twisted out of level without twisting the car body. Eccentric plates allow of chain adjustment, but it has been found that in a year's running there is no perceptible wear on the chains. Chain noise is entirely eliminated.

Both axles are of 2 inch diameter tubes with seven-thirty-second inch walls. The spindles are 1 fs inches in diameter. Cup and cone ball bearings are used, the inner bearings having five-eighth inch and the outer one-half inch balls. The wheels are



EMPIRE POWER PLANT.

32 inches in diameter, with 31/2 inch tires.

The rear springs are what is commonly called "full platform" or "double platform." They are made of four semi-elliptic springs, each 134x40 inches, giving a total spring length of 160 inches. The rear cross member of this spring is attached to a projection on the angle steel frame. The front is fastened to the tube which houses the propeller shaft. The front springs are three-quarter elliptics, with hinge joints, instead of the linked joints commonly used when these springs are placed at the rear. They are 1½x36½ inches.

# STEERING AND CONTROL.

Steering is by a pinion and sector gear, cross connected to the left knuckle. The spark and throttle control levers are under the wheel, on the left side. The clutch is cam operated by a pedal. This first throws out the clutch, and further movement applies the band brakes to the differential drive, which is located inside the gear case. The emergency brakes consist of bronze shoes, which expand against drums integral with the wheel sprockets. Being inside the chain cases they are fully enclosed. They are operated by the side hand lever, which is ratchet retained.

#### GENERAL DIMENSIONS AND BODIES.

The wheel base is 96 inches and the weight is given as 1,350 pounds. Two styles of bodies are fitted to this chassis. Model A has a moderately high seat, a considerably inclined 15 inch steering wheel, and a tool box mounted on the rear deck. Model B has a very much more sharply inclined 18 inch steering wheel, and a lower seat, with the gasoline tank at the rear. It is also furnished with a 1½ inch Schebler carburetor of the most expensive type, a somewhat simpler 1 inch Schebler carburetor being used on Model A.

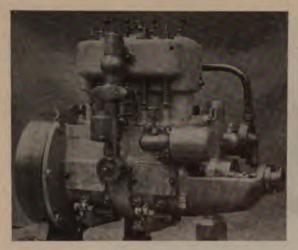
It will be seen that all working parts of these cars are very carefully enclosed. This fact, combined with the 12 inch centre clearance of both models, should make them ideal cars for use over rough and muddy roads. Model A may be geared so that its maximum speed is 35 miles per hour, giving a very powerful car of moderate speed. On the other hand the small weight and free running qualities permit of gearing Model B so as to make it a very speedy car.

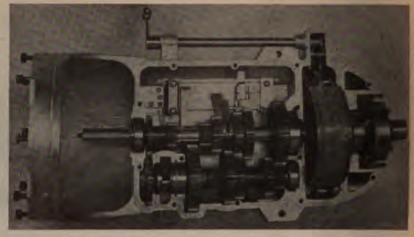
### The Saurer Two Ton Truck.

Albert T. Otto, 1876 Broadway, New York, American agent for the Saurer trucks, has just received a new 2 ton truck which contains a number of interesting features.

It is powered with a four cylinder block motor of 88 millimeters bore and 110 millimeters stroke (3½x4fs inches). The

valves are on opposite sides and interchangeable, the exhaust valves being on the left. The crank shaft is mounted on three annular ball bearings, which are of such proportions, it is claimed, that some of the engines have been run for





MOTOR AND CHANGE GEAR.

three and a half years without renewing the bearings. The engine is certainly more compact than it could be built with plain bearings of sufficient length.

The inlet, exhaust, water inlet and water outlet pipes require but a single connection each to the engine. The exhaust pipe is led straight down past the centre of the engine, and is surrounded by an air jacket from which hot air is drawn through a cored passage in the crank case to the lower end of the carburetor.

A centrifugal governor is provided, driven by a separate gear at the left of the cam shaft gear case. This governor prevents the engine from exceeding a certain predetermined speed, which may be set to suit the owner, but cannot be changed by the driver, as the adjustment is inside the case. This prevents overspeeding the engine in changing gears or in running on the low gears, and also prevents the driver from running the truck when light at a speed injurious to its mechanism.

The oil tank is located directly back of the radiator, just inside the frame, at the right hand side. The gear pump, which circulates the oil for splash lubrication, is placed inside of the tank at its rear end, and is driven from the inlet cam shaft by spiral gears and the small shaft shown in the cut of the engine just back of the governor. The water is circulated by a centrifugal pump mounted on the front of the timing gear cover and driven by a gear meshing with the exhaust cam shaft gear and a shaft, which also extends backward to drive the magneto. The water is delivered from the pump to the lower part of the exhaust valve chambers and returns to the top of the radiator through a pipe from the centre of the top of the cylinder casting. The radiator is supported from the front cross member by two bolts passing through the lower corners from front to rear, and also rests on a felt pad on the cross

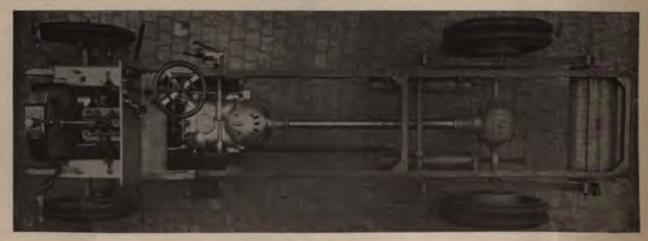


STEEL CASTING SUPPORTING FRONT OF MOTOR.

member. The fan consists of four sheet aluminum blades on a cast hub, and is supported on an L shaped round post projecting upward from the socket shown at the top of the timing gear case. A nut threaded on this post rests on the top of the socket and serves to adjust the tension of the 1½ inch leather fan belt.

Ignition is by an Eisemann low tension magneto, with single coil and high tension distributor on the magneto. No battery is used, as the self starter provided makes a battery for starting superfluous.

The engine is designed to act as a brake. The throttle lever on the steering wheel is provided with a stop as usual, to prevent closing off the supply of gas entirely. The lever can, however, be pushed past the stop. and further movement opens the inlet pipe to free air. At the same time the exhaust cam shaft is being shifted by a linkage from the throttle lever and a spiral sleeve on the end of the shaft. With the cam shaft in its normal position there is little braking effect from the engine, except that due to friction, as the air which is compressed during the up stroke of the piston is expanded again during its down stroke, returning most of the energy absorbed. However, by shifting the exhaust cams forward through an angle of about 90 degrees so that the valves open at the top of the stroke and close at the lower end, each up stroke of the piston is made a compression stroke. On one down stroke air is drawn in through the inlet valve, and on the next through the exhaust valve. At the end of each up stroke the compression is released by the inlet and exhaust valve alternately, before more air is drawn in through the same valve. The engine then absorbs power equal to about three-fourths of its nominal output at the same speed. The gears mus. of course, be shifted in going down a steep hill, and the engine is claimed to hold down



PLAN OF CHASSIS.



SAURER REAR AXLE AND PARTS.

ed of the car on any hill which it mb on the same gear. Also, by g the position of the cams only from normal, the braking power of ne is not great, and can be increased ed to the maximum available.

engine is also provided with a self device operating by compressed air. l air compressor is mounted upon inge gear case and driven by the gears seen at the extreme front end case. A special lever on the dash set in any of three positions as folhe first is the filling position. The p is then in gear, filling the storage a pressure of about fifteen atmos-The pressure valve to the distributor d. The second is the neutral posi-The compressor is then out of gear. pressure valve is closed. The third tarting position. The pressure valve distributor is open and the pump is

distributor valve is placed between and third cylinders, and directly e exhaust cam shaft, from which it n by mitre gears. In it are two at right angles, as shown in the I drawing, each admitting air to pipes to two cylinders. Each pipe an automatic poppet valve in the valve cover. The distributor valve ned that compressed air is admitted cylinder, while its piston is on its troke, so the engine runs as a comair motor until it takes up its regu-. The compressed air tank is loongitudinally at the rear of the frame on the right hand side, oppomuffler. It is about 6 inches in diby 40 inches long, and is said to ir enough for fifteen or twenty

clutch is a leather faced cone. The ssion is a four speed and reverse gear with selective control. There rough drive, all speeds being through ntershaft, so that a reduction is altrained in the gear case. The case d to a flange on the engine crank st in front of the flywheel, thus a unit power plant, which is suptone point in front on the cast steel

front cross member of the frame and at two points in the rear upon another cross member.

The drive to the rear axle is by propeller shaft, with a single universal joint. The propeller shaft casing acts as a torsion member and distance rod. The rear axle is a full floating construction, and the casings are provided with integral flanges bolted to the bevel gear housing. Owing to the reduction in the gear case the bevel



RANDS AUTOMATIC WIND SHIELD.

gear is not large. Cam expanded emergency brakes act on the rear wheels, and the contracting shoe foot brake is entirely enclosed in the rear of the transmission year case.

The frame is of pressed steel, channel section, with truss rods to reinforce the side members. The ends of the cross member under the transmission extend below the side members and serve as truss rod

supports. Springs are all semi-elliptic. The wheels are fitted with Polack solid rubber tires, 36x5 front and 38x4 twin rear. The wheel base is 141 inches.

# The Rands No. 10 Disc Automatic Wind Shield

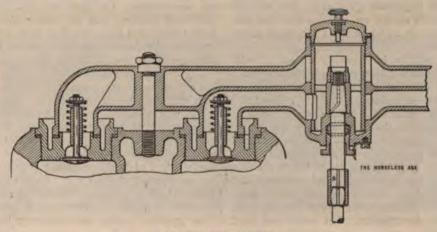
The Rands Manufacturing Company, 67-89 Fort street East, Detroit, Mich., have recently placed on the market a new design of automatic wind shield under the above name. Special claims are made as to the lightness of the shield. It will be seen from the accompanying cuts that it takes three positions, viz., vertical, inclined at 45 degrees, and folded, and it can be placed in any of these positions from the seat. In the construction of this wind shield only drawn channel tubing, Parsons manganese



DETAILS OF WIND SHIELD.

bronze castings and hard stamped brass parts are used. The glass is three-sixteenths of an inch plate glass, and is held by spring stops. The stay rods telescope.

These shields are supplied to fit any car, in three different designs. For standard touring cars the upper half is made 11 inches high and the lower half 17 inches. Where the angle of the steering column will permit of it a shield of the same height, viz., 28 inches, is supplied to hinge in the middle, bringing the division nearer to the dash. The third size is suitable for roadsters, runabouts and phaetons; it is only 26 inches in height and divided in the centre. The operation of the shield is obvious from the above cut.



SYSTEM OF STARTING.

# The Couple-Gear Gas-Electric

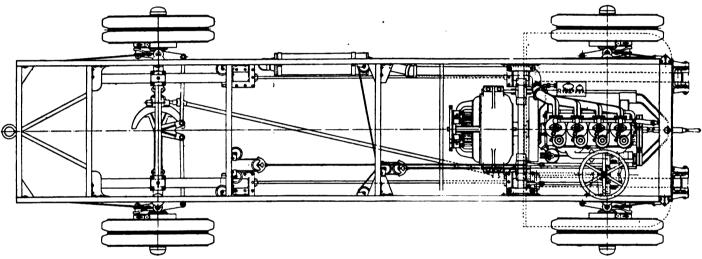
These trucks are made by the Couple-Gear Freight Wheel Company, of Grand Rapids, Mich. For the benefit of those readers who may not be familiar with it we will describe the driving mechanism, which is similar to that of the company's electric trucks. The wheels are made up from two cones of metal. Inside the case thus formed is mounted an electric motor whose frame forms part of the wheel spindle and whose shaft lies nearly in the plane of rotation of the wheel. There are two small bevel pinions, one on each end of the motor shaft. These mesh with two large bevel gears secured to the wheel, which face each other. One pinion meshes with one gear and the other pinion with the other, at a point diametrically opposite, the armature shaft being set at a slight angle to allow this. There is an equalizer I section forgings, bushed with nickel babbitt below and phosphor bronze above. The pistons have four step-jointed rings. The flywheel is 21 inches in diameter, bolted to a flange forged integral with the crank shaft. The end bearings have ring oilers, while the others are lubricated from splash pockets. Force feed is used to the cylinders and the end bearings. Ignition is by jump spark from current furnished by a gear driven magneto. A governor maintains an engine speed of 700 r. p. m., but the speed may also be regulated by throttle levers.

The generator is a six pole commutating pole type, of 12½ kilowatt capacity. This capacity is sufficient to furnish all four motors with current for a 200 per cent. overload, it is claimed. Its bearings are of plastic bronze, of the self oiling type. The generator weighs about 750 pounds and the engine about 650 pounds. Engine and gen-

storage battery, and they give the advantages of an unlimited radius of action, together with a wide range of speeds.

# Cameron Transmission for Six Cylinder Car.

The rear axle mounted three speed transmission which has been used for several years upon Cameron four cylinder cars has recently been designed to render it applicable to use upon the six cylinder, 30-36 horse power models. This transmission, as formerly built, was fully described on page 471, Vol. 21, of this journal. The above mentioned change consists in the use of two instead of three gears upon the sliding shaft, which is driven by the motor through a bevel pair and the employment of two gears instead of a single gear attached to the differential frame on the rear axle. This construction materially shortens and renders more rigid the sliding shaft, and



THREE AND ONE-HALF TON GASOLINE-ELECTRIC TRUCK.

or "evener" in the armature shaft, so each pinion does its share of the driving. With this arrangement of driving gears it is possible to get a reduction of 25 to 1.

The wires which carry current to the motor pass through the hollow wheel spindle. The spindle is mounted in a pivot, which turns in the axle fork for steering in the usual manner. All four wheels are used for driving, breaking and steering.

The combination trucks are at present made in 3½ and 5 ton sizes. We will first describe the 3½ ton machine and then note the points in which the 5 ton truck differs from it.

Power is furnished by a four cylinder motor with 5 inch bore and 5½ inch stroke. The cylinders are cast separately, with inlet valves in pockets at the side and exhaust valves overhead, both operated from a single cam shaft. The valves are of cast iron with steel stems. The tappets and cams are made from tempered tool steel.

The crank shaft is 134 inches in diameter with five bearings, bushed with die cast nickel babbitt. Bearing caps are of manganese bronze, fastened with through bolts from the cylinders. The crank case is of aluminum alloy. The connecting rods are

erator are carried on a sub-frame, which is supported at three points. The complete power plant is thus removable as a unit by disconnecting water and oil pipes, controller levers, etc.

The wheels have eleven tooth driving pinions and 33 ampere motors. The frame is of channel steel, with an over-all length of 18 feet 6 inches. The loading space is 14 feet long. The wheel base is 144 inches and the tread is 66 inches. All four springs are semi-elliptic. The tires are dual, 3½ inch solid rubber. The car weighs about 8,000 pounds and has a speed of from 5 to 12 miles per hour loaded and 10 to 18 miles per hour empty.

### THE FIVE TON TRUCK.

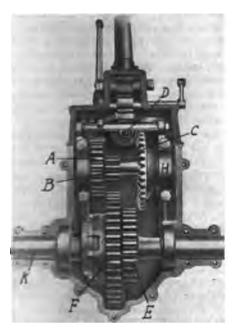
The engine of the 5 ton truck has a 6 inch stroke. The generator is a 15 kilowatt, and engine and generator weights are about 700 and 850 pounds, respectively. The gear reduction is somewhat greater, for a nine tooth pinion is used. This gives a loaded speed of 5 to 9 miles per hour and an empty speed of from 7 to 12 miles per hour. The tires are 4 inch dual solid rubber, and the weight is about 10,000 pounds. The gasoline engine and generator are found not to weigh more than a suitable

renders the gear set more compact and structurally more desirable.

The accompanying cut illustrates the new design. A is a fourteen tooth bevel pinion fast to the drive shaft and in constant mesh with the thirty-nine tooth bevel gear fast to the movable shaft H. This shaft runs at about 0.36 engine speed, and is held in large annular bearings in a frame, guided in such a manner that the shaft may be given a motion of translation to and from the vehicle axle K. Upon this shaft are slidably fixed the twenty-five tooth spur gear A and the eleven tooth gear B. To the differential housing are secured the corresponding gears E and F of thirty-one and forty-five teeth, respectively. To engage the low speed gear B is slid on shaft H into line with gear F and shaft H is moved toward the axle, these movements being effected by the motion of the gear shifting lever in selective slots. A reduction of II.4 to I is then effected.

To secure the intermediate speed gear A is slid into mesh with gear F, and the ratio engine of speed to axle speed becomes 5 to I.

The high gear is secured by shifting the sliding gears along shaft H until gear A



CAMERON TRANSMISSION FOR SIX CYLINDER CARS.

comes opposite gear E, and meshing these gears by moving shaft H toward the axle. The speed of the latter then is reduced in the ratio of 3.45 to 1.

Reverse motion is obtained by moving an idler (not shown) into simultaneous mesh with gears B and F, the ratio of speed reduction being the same as with the low gear. The gear set affords a larger difference between high and low gear than did the one formerly used. With the old transmission the ratio was 2.4, while with the new one it is 3.3.

The annular ball bearings used in this gear box are very large, and of the Cameron Company's own manufacture. In the operation of this gear set no more gears are involved when the low speed is engaged than when the high or intermediate speeds are in use, and the car is practically as quiet on one gear as on another.

# New Style of Body.

A recent European innovation in body design has been taken up in this country by the Lozier Motor Company, of Plattsburg, N. Y., who have produced what they call the Lakewood model, with a torpedo type of body. It is mounted on a runabout chassis, with an extreme inclination of the steering wheel and low seats. The dash is hooded in the same manner as the Briarcliff model: but instead of the front seats being open the sides are entirely enclosed, entrance to the driver's and mechanician's seat being gained through doors, making the sides of the body enclosed from dash to rear, only the shoulders and arms of the occupants of the car being visible from the outside.

Among the advantages of the new body special emphasis is laid on its dustlessness, resulting from the smooth sides, which end in a perfectly smooth, rounded rear seat. The rear tonneau seats are quite low, the

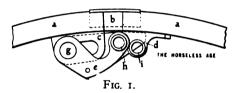
same as are the two front seats, and an unusual feature of the tonneau is an inclined toeboard, which is drawn up into position for the feet after the passengers are seated, and by means of a spring release can be dropped level when the passengers are ready to leave the car.

# The Universal Demountable Rim.

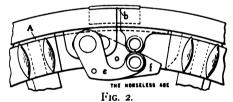
This rim, which is made by the Universal Rim Company, of Chicago, has been tried out in practical use for some time on taxicabs as well as private cars in and around Chicago, and has been found quite satisfactory, owing to its simplicity and the rapidity with which it can be placed in position and removed from the wheel, and also owing to the ease with which a tire can be placed upon the rim.

The rim is of that type in which an ordinary clincher rim is cut across at one point and held expanded at this point about five-eighth inch, and when in position is locked on the wheel by the contraction of the rim, which is effected partly by the pressure of air in the tire and partly by a locking mechanism placed at the joint of the rim to which the tire is attached.

Fig. 1 represents the joint of this rim



Rim locked open when carried as a spare. Opened, as when carried as a spare. The two ends aa of the rim are covered by a sheet metal piece b on the inside, to protect the tire at the joint. The two halves



Rim placed in position on wheel latch in unlocked position.

c and f of the locking latch are attached to a slotted lug c on either side by the pin g, the two other ends of the latch being secured by the pin H.

The rim is held in the open position

against the pressure of the air in the tire by the pin H of the locking lever which abuts against the left hand side of the lug d. The rim to which the tire is attached rests on a flat rim A on the wheel (see

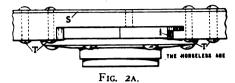
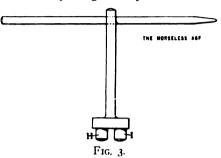


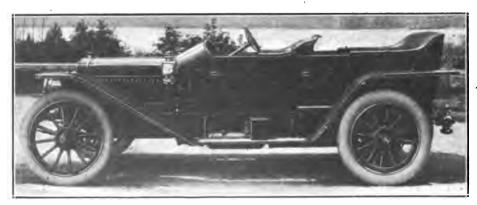
Fig. 2). A recess is cut in this rim and the felloe of the wheel, to receive the locking device, the felloe at this point being reinforced by a segmental plate S which is



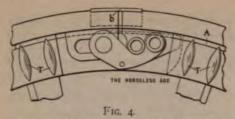
The pins H and I fit holes h and i of latch and lug d.

held in position by the T headed bolts TT (see Figs. 1 and 2). The valve stem is located opposite to the joint in the rim, and fits in a hole provided for it in the wheel. About 3 inches on either side of the valve stems are pins about one-quarter inch in diameter, which fit into corresponding holes in the wheel. Two similar pins are placed at about 120 degrees from this point. These, when the tire rim is contracted on to the wheel, effectually prevent creeping and sidewise motion.

To lock the rim on to the wheel or to unlock and remove the same, a key or tool is employed which has two pins which register with the hole H of the locking lever, and the hole i of the lug d (see Fig. 3). In either case a half turn does the business. One end of the crossbar of the tool is flattened so as to form a tire tool, which, it is claimed, is all that is necessary for the manipulation of a tire on the rim. It will be noted that the end of the plate of the latch passes into an undercut slot l of the recess into which the locking mechanism fits, this being one turther safeguard



LOZIER LAKEWOOD MODEL.



Rim on wheel with latch in locked position,

against side motion of the rim relative to the wheel. To make all doubly secure, however, a small bolt is passed through the plate S, the felloe of the wheel, the plate / and the lug d, thus securing the two ends of the rim effectively together, preventing the unlocking of the latch and insuring further against sidewise motion, the end of this bolt being provided with a wing nut. It will be seen that with the latch in the unlocked position there is no connection between the two ends of the tire rim, the plate b, which is of thin brass, simply being laid in position and held by the pressure of the air. To remove the tire from the rim the flattened end of the crossbar of the key-like tool is placed between the tire and rim, and the end of the rim is pried away from the cover; then the cover can be readily separated from the rim. The new tube being placed in the cover, the rim is replaced in a similar manner to that in which it was removed. As only a small amount of stretching of the cover is necessary, it is claimed that quick detachable tires can be used on this rim without lugs. However, those who wish to do so may use clincher tires with lugs. The makers claim that, apart from the rapidity with which the rim can be manipulated, the likelihood of the operation being interfered with by breakage or rust is practically nil, owing to the strength and simplicity of the rim, its small number of parts and the general de-

Franklin Torpedo Car.

A car with a body shaped like a torpedo has just been turned out at the works of the H. H. Franklin Manufacturing Company, Syracuse, N. Y., for the personal use of President H. H. Franklin. At what would be the water line in a torpedo the car body is of eigar shaped section, so as to minimize the air resistance. The body is long and low, and the hood is shaped like the bow of a boat. On the whole the design is a development of what is known in Europe as the "dustless body" design, the exterior being smooth, and nothing projecting below to stir up the road dust. Both the front and rear seats are provided with doors flush with the top of the dash. At the front there is only one door, however, on the left hand side, away from the driver. The car has the regular six cylinder, 42 horse power engine, but is geared higher than the stock model, and is claimed to be capable of from 60 to 75 miles per hour.

The equipment of this car is said to be exceedingly complete. It includes such items as an electric cigar lighter, special monogram stationery, caps, goggles, gloves, maps, toilet articles and a "first aid to the

injured" outfit. The name "Franklin Torpedo" is engraved on a silver plate secured
to the highly polished Circassian walnut
dashboard just above the hood. The point
of the hood is surmounted by a small silver
American eagle. A novelty among the
equipment consists of a circular wind shield.
It has a glass about 1 foot in diameter, and
is held by an adjustable nickel standard
close to the face of the driver. This wind
shield was specially designed for the Torpedo. The electrical equipment includes a
speedometer, light and small electric auxiliary lights for the oil side and rear lights.
Acetylene headlights are fitted.

The seats are low and are heavily upholstered with goat skin of a light chocolate



FRANKLIN TORPEDO.

hue. The same material is used for the rest of the interior. The exterior metal work is of polished nickel. The body is made of aluminum, and its battleship gray is striped with pearl gray; on the sides appears Mr. Franklin's monogram. The aluminum is given a rubbed instead of a highly polished finish.

The top, instead of being the regular black, is made of dark blue auto cloth. Long sloping mud guards surmount the forward wheels, harmonizing with the long, ununbroken lines of the car; semi-circular ones surmount the rear wheels. A Nightingale whistle is carried instead of a horn.

The emergency brake and gear change levers are just without the side of the car instead of inside. A circular hood of regular Franklin design is made interchangeable with the one of prow design; the latter provides for the admission of the cooling current for the air cooled engine by means of a row of openings in the top of the hood.

# The Middleditch Two Cycle Fuel Injection Motor.

The Detroit Engine Works, Detroit, Mich., are producing a line of two cycle engines fitted with the fuel injection system devised by Benjamin Middleditch, of that city, which permits of the use of either kerosene or gasoline as fuel.

These engines are of the two port type, with spring controlled poppet valve admission to the crank case, shown at P. The fuel feed system is arranged as follows: B is a fuel bowl containing the float C. A pipe D is connected at one end to the transfer passage E, and its other end enters the bowl B above the fuel level. A is the fuel pipe leading from the supply tank, which may be at a lower level than the fuel bowl X is a ball check controlling the flow of fuel from the feed pipe and opening toward the fuel bowl. Float C also carries a ball check valve opening away from the fuel bowl. I is a fuel spraying nozzle, located nearly on a level with the top of the fuel in B, and set so as to introduce fuel directly into the cylinder at the centre of the admission port. This spraying nozzle is connected by a passage (not shown) with the bowl B, and a needle valve T is inserted in this passage to regulate the rate of fuel supply.

The action of the arrangement is as follows: On the up stroke of the piston the transfer passage E and the exhaust passage N are closed and a rarefaction takes place in the crank case O. The inlet poppet P opens against its spring and pure air enters the crank case. At the same time the rarefaction is transmitted through passage D and acts upon the surface of the fuel in B. If the float level is high enough the ball valve which it controls will keep closed and no liquid will enter the fuel bowl, but if the level is slightly too low, on account of the use of fuel in previous ex-

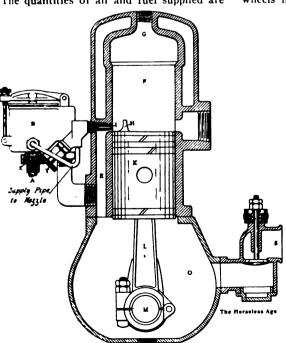


FRANKLIN TORPEDO.

plosions, the float check valve will be open and ball check X will rise from its seat under the suction, allowing fuel to be drawn into the fuel bowl to bring up the level. Compression, of course, takes place in the cylinder during this stroke, and firing, expansion and exhaust in their usual order.

On the down stroke poppet P closes and the charge of air drawn into the crank case is compressed. This crank case pressure is communicated through D to the surface of the liquid in B, and, as ball check X opens outwardly, there is no escape for the fuel, as the transfer passage E and spraying nozzle I are closed by the piston. When, however, the piston nearly reaches its lowest point the transfer port is uncovered and the compressed air in the crank case rushes into the cylinder against the baffle plate H. At the same time the spraying nozzle I is uncovered and fuel is energetically sprayed therethrough under the influence of the gaseous pressure on the surface of the liquid in the fuel bowl. The fuel and air are mixed upon entering, and their entrance tends to scavenge the cylinder, as in all engines of this type. The above enumerated actions are repeated indefinitely so long as the engine is in opera-

It will be noted that the amount of air entering the crank case depends upon the extent to which poppet P opens during the up stroke of the piston. This is regulated by the adjustable throw stop R, which is virtually a throttle. The smaller the throw which is allowed P the less the amount of air admitted will be and the lower will be the crank case pressure. The lower the crank case pressure the lower will be the pressure communicated through passage D to the surface of the liquid in the fuel bowl and the less will be the pressure resulting in forcing fuel through I into the cylinder. The quantities of air and fuel supplied are



Two Cycle Motor.

thus interrelated, and tend to maintain a constant proportion. No fuel is admitted to the crank case, and there is therefore no effect produced upon the lubricating oil there used.

By means of the valve throw stop R a wide range of speed and torque is attainable

It is claimed that these engines operate about equally well on gasoline and kerosenc. When the latter fuel is used the cylinder and air poppet are primed with gasoline in order to furnish an inflammable mixture for the first explosion.

# Veeder Form B Odometer.

The new model of the Veeder odometer, Form B, is equipped with a new style twisted tooth gear. This style has many advantages over the old type of cut gear. inasmuch as it has all the advantages of a thin narrow faced gear for cutting the mud, and also the advantage of the wide face of tooth, which gives a greater wearing surface and allows for a side or end play. This makes close endwise adjustment unnecessary. The gear is made of steel, and it is claimed that it will last indefinitely. The bearings are much heavier and improved over the 1909 model. With this new gear and these new bearings the wearing qualities of the odometer have been greatly increased.

This type is especially adapted for trucks and heavy vehicles. The Veeder Manufacturing Company are now supplying the trade with this type of instrument.

# Novel Points in Holsman 1910 Models.

The 1910 models of the Holsman Automobile Company, of Chicago, do not differ materially from the 1909 models. The wheels have been slightly reduced in size.

The 1909 models had 42 inch front and 46 inch rear wheels, whereas the 1910 models will have 40 inch front and 42 inch rear wheels. The 1910 models have greater hill climbing power on both the low and the high gears. Nickel-chrome naked friction chains have been substituted for the driving cables formerly used. The mechanism for changing from the high to the low gear has been improved, and is now more easily operated. There has also been an improvement in manufacturing methods, especially as regards heat treatment of some of the material used. The company during the coming season will market the four cylinder model, of which a description appeared in our columns some months ago, in addition to its two cylinder cars. Its line includes runabouts, surreys and open and closed commercial vehicles.

### The Gabriel Bugle Horn.

A new product of the Gabriel Horn Manufacturing Company, of Cleveland, Ohio, is the Gabriel bugle horn, a four tube horn suitable for playing bugle calls, etc., as well as for regular signal purposes. It is operated by the exhaust from four and six cylinder motors. The horn is operated by a keyboard comprising four keys, each controlling one of the notes; this makes it pos-



GABRIEL BUGLE HORN.

sible to operate each note separately, and all sorts of bugle and trumpet calls can be correctly produced. The tone is said to be very clear and far reaching. The keyboard is fitted with a small lever for sounding all four notes at the same time for signal purposes, by simply pressing the pedal. The horn is constructed of solid brass tubing, highly polished. All joints are silver brazed, and the valves are carefully fitted.

The valves which lead to the keyboard are adjustably attached to the valves, consequently the pull can be in any desired direction, and the horn and keyboard may be located to suit the operator. A convenient arrangement of the horn is shown by the cut.

# New Witherbee Magneto.

The Witherbee Igniter Company, of Springfield, Mass., have designed a new high tension magneto. Two and four cylinder models have been made and are being tested out by their engineer and by the Maxwell and other automobile companies. We expect to publish a description as soon as they have fully settled the design.

### Test Run of 1910 Rambler.

The 1910 model Rambler touring car sent out from the factory at Kenosha, Wis., for a test run on June 22 arrived back at Kenosha on August 16 after having covered more than 3,900 miles in twenty-four days. Agents of Thomas B. Jeffery & Co. piloted the car from city to city, starting at Kenosha, and proceeding from there to Indianapolis. Louisville, St. Louis, Kansas City, Lincoln and Omaha. C. Steward, agent at Omaha, drove the car from that city to Kenosha without relief. After being overhauled the car will be sent to Kansas City to compete in the Kansas City Star endurance run.

# COMMUNICATIONS



### Location of Brakes.

Editor Horseless Age:

We have seen several articles in various papers lately in answer to inquiries of readers as to the proper location of motor car brakes. So far as memory serves us for the moment, nearly all of these replies have side stepped any definite stand, and have straddled the fence in such a way that it still leaves considerable doubt as to whether, in their opinion, both brakes should be on the rear wheel drum or one brake upon these drums, with a service brake upon the drive shaft.

We are ourselves advocates of that system wherein the emergency brake is located upon rear wheel drums of large size, operated by a hand lever, and of such surface and leverage as to instantly lock the wheels if desired by the operator. The service or running brake, we believe, should be placed upon the drive shaft, should be operated by the foot, and should be of such size and construction as to enable the operator to apply it gradually and easily.

This arrangement is strictly in accordance with all foreign practice, and has, so far as we have been able to observe, every argument in its favor.

We should like very much to hear through your columns some of the views of those who advocate the use of two sets of brakes upon the rear wheel drums.

CHALMERS-DETROIT MOTOR COMPANY.

### Dry Cell Tests.

Editor Horseless Age:

On March 30, 1909, I began a test of two standard makes of dry cells. The test was made in a two cylinder machine. Twenty cells were used, ten of each kind, and well connected as per diagram.

At the beginning of the test on

LC	, ,,	O.	
March 30	1	Total amperes,	189
	2	••	201
May 31, mileage 202	1	••	238
	:	••	208
July 9. mileage 523	1	••	207
	2	••	95
August 8, mileage 408	1	••	189
	2	Discarded.	
Record of amperes of ind	ivid	aal cells on M	arci

Lot No. 1: 18-20-19-19-18-18-19-20-19-19. Lot No. 2: 19-19-22-18-20-19-22-20-22-20.

Lot No. 2: 19-19-22-18-20-19-22-20-22-20.

Record of amperes of individual cells on July 6—

Lot No. 1: 20-20-20-20-20-23-22-20-21.

Lot No. 2: 10-10-10-12-5-10-5-7-8-12.

The same ammeter was used in this test, and is probably a good average one,

Why did both lots of cells show more amperes after two months' service than at the beginning? Does the change of temperature raise the amperage, and about what would it be under ordinary circumstances? Would it be sufficient to account for the increase shown on May 31?

Is it possible that Lot No. 1 could draw and build up from Lot No. 2? Is it possible that, connected in this way, Lot No. 2 could have furnished all the current on account of the difference of the internal resistance in each lot?

M. B. JOHNSON.

[The increase in the short circuiting current of the dry cells after two months' use is probably largely due to the higher temperature prevailing at the end of that period. According to some tests made for The Horseless Age about two years ago the voltage and current of a dry cell are increased between 20 and 25 per cent. when the temperature is raised from 3° Fahr. to 72° Fahr. In your case the aggregate amperage of one set was raised 26 per cent. and of the other set 3½ per cent. But the fact that the amperage did not increase the same in both sets shows that other factors besides the temperature entered.

If the voltage of Lot No. 2 was much higher than that of Lot No. 1 the latter would draw current from the former and build up on it. This would be the effect if there were more cells in one series than in the other. Several rows of cells should be connected in parallel only, provided their

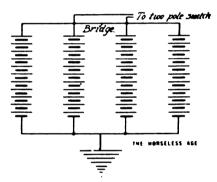


DIAGRAM OF CONNECTIONS.

voltages are alike. Whether the internal resistances are alike or not does not matter so much. With equal voltages the different rows would deliver currents inversely proportional to their respective internal resistances, but there could be no crossflow.

-ED.]

# The Interference of Wide Front Fenders With Accurate Steering. Editor Horseless Age:

The very wide, flaring front fenders, joined closely on the inside to the vehicle body, which are now in general use, and which serve their purpose so admirably, are not, however, without a slight disadvantage, which I have never seen adverted to in these columns. I refer to the fact that they absolutely cut off the view of the front view of the front wheels from the operator, and prevent him from knewing in what direction they are pointed. The steering wheel, made as it usually is, with a perfectly plain rim, gives no indication as to the inclination of the front wheels.

In ordinary driving this condition is not at all objectionable, for there is plenty of room available, and even though the car starts in an unexpected direction, when power is applied after a stop has been made, there is plenty of opportunity afforded safely to correct the direction of motion.

On the other hand, when it becomes necessary to manœuvre a car in very close quarters, as in driving out of a crowded garage or from one of the tangles of vehicles frequently encountered under congested traffic conditions, it is very desirable and highly conducive to safety that the operator should know, at all times, just how his steering wheels are pointed. There is little room for false starts, and slight accidents sometimes result from a lack of knowledge as to front wheel inclination, and consequently as to the direction in which the car will start upon the application of power. Considerable time is frequently lost in manœuvring from false movements resulting from ignorance of steering direction.

When a car is to be "cut over" from one direction of turning to the other there is no indication given the driver when the straight ahead position is passed, and it is rather difficult to estimate, without trial, how sharply the car has been "cut" in the new direction. It is not uncommon to witness a good deal of unnecessary backing and filling arising from this cause.

There would be an advantage gained, it would seem, were some indicator of steering wheel position provided, which should show the driver in his seat just how the wheels are inclined, and the writer believes that manufacturers would do well to give thought to this detail among the other small points which they are industriously working out.

The mere provision of a mark molded into the steering wheel rim, so that it could be felt as well as seen, and so placed as to be directly away from and in front of the driver, when the wheels are pointed straight ahead, would be of some advantage, although it would be useless to indicate the more acute angles of the front wheels, which are effected by more than one-half turn of the hand wheel from its straight ahead position.

Some expedient more effective than this can undoubtedly be worked out without involving undue complication. L C

# A Case of Overheating.

Editor Horseless Age:

Being a subscriber to your paper and being in trouble with my engine, I write to you for information.

I have a —— friction drive car, with a two cylinder opposed —— engine of 18 horse power. I had trouble all last summer with it heating. After running the car, say, 2 miles, the water would boil out of the radiator as soon as I stopped. I was feeding the engine even more oil than is usually required, in the hope of preventing the water boiling. I drove with the spark as far advanced as it would go without knocking. Not being able to discover the difficulty. I sent the engine back to the factory

where it was made. After doing so I received a letter from the manufacturers in which they stated: "The only thing we found wrong with the motor was that the piston rings had too much play and the gasoline escaped back through them, and this is what caused it to heat. We put in new rings, and when it was tested out it ran as smooth as any engine sent out of our factory."

This is a new engine, and the compression was very strong last summer. For this reason the repair man here could not understand how the piston rings could have been found so loose. We put the engine back in my car, and it heats just as it did last year. Thinking that perhaps the carburetor was at fault I put on a it made no difference. The radiator holds one pail of water. I understand some cars carry more water than this, two pails full. Do you think that adding an extra tank, so as to double the amount of water used, would do any good? Or can you suggest anything to overcome this heating of the engine? Any suggestion you can make will be greatly appreciated. C. A. Kortsch.

[The fact that the motor heated just the same after it was returned from the manufacturers shows that the cause assigned for the heating by the manufacturers was not the true one. In case a motor overheats it is a pretty safe conclusion that the cooling system is not doing its duty. That is, either the water is not circulating rapidly enough through the system, or the radiator is not of sufficient capacity to dissipate the heat absorbed by the jackets. We do not know what method of circulating the cooling water is used on your car, but we are strongly of the opinion that if you increase the cooling capacity you can do away with the trouble from overheating. If your water is circulated on the thermo-siphon system it would perhaps be better to install a pump, so as to insure positive circulation. The provision of a fan back of the radiator if possible, and if there is none already, would considerably add to the cooling capacity. But if you already have a pump and a fan the only remedy for the trouble would seem to be to use a larger radiator.-Ep.]

# Six Cylinder Specifications. Editor Horseless Age:

Would it be possible to make a substantial good grade automobile, weighing 1,600 pounds, of the following specifications: 112 inch wheel base, 36 inch wheels, six cylinder, 30 horse power motor, selective transmission, standard tread, clearance 11 inches, cylinders water cooled and cast in pairs, two passenger body? Would this not be an economical and speedy roadster?

J. E. M.

[A car to meet your specifications can be built, but would, we believe, be very expensive to manufacture, as all possible methods of "weight paring" would have to be resorted to. The average six cylinder, 30 horse power car, of about 112 inch wheel

base, weighs considerably more than 1,600 pounds. It would certainly be a speedy car, and, if well built, also economical to operate.—ED.]

#### Farm Tractors.

Editor Horseless Age:

Kindly give me the addresses of the firms in New York who manufacture farm tractors.

INQUIRER.

[No such tractors are manufactured in New York.—ED.]

# Motor Trucks in the Recent Massachusetts Manœuvres.

Two Packard gasoline trucks were used in the manœuvres which were held in Massachusetts during the week beginning August 15. One of the trucks was used by each of the opposing armies. The War Department at Washington, D. C., possesses very accurate figures concerning the mobility of an army under the old system. For instance, an army on foot, when in good physical condition, can cover 15 miles per day, averaging two and one-half miles per hour on the march. A division train is 15 miles long and consists of 192 commissary wagons. Each wagon to move properly and without stalling requires 60 feet of road space, and when having a four mule team hitched to it can carry 2,500 pounds. Allowance must be made for 48 pounds of oats and hay for each team per day. The following figures tend to show the superiority of the gasoline truck for this class of work:

The Packard three ton 24 horse power truck, which was used last week, covers 12 miles an hour at a governed speed, and carries a normal load of 6,000 pounds. It takes up only twenty feet of road space, one-third that required for the teams. In other words, such a truck carries more than two four-horse or four-mule teams and travels five times as fast for an unlimited distance. There is also an economy of 100 feet in road space, which means much in dispatching an army strung out in a long line over narrow roads. When an army is on a forced march through the enemy's country, scouts, pickets and outpost men try harder to kill off the horses of the invaders than the men themselves. Only a small portion of a motor truck is really sensitive to gun fire, and that can be fairly effectively protected by armor.

Perhaps the greatest advantage of a motor truck to an army in the field is the increased area of operation which it makes possible. According to old military standards, an army cannot be permanently located at more than 30 miles from its base, this being the maximum distance over which supplies can be successfully carried by horses. If a division is sent as much as 45 miles from its base it will run out of food in eleven days. With motor trucks, on the other hand, an army could be supplied at a distance of 150 miles from its base, and trucks could even be success-

fully handled at a distance of 250 miles if occasion seriously demanded it.

The Packard truck in the service of the Quartermaster's Department of the Red Army in the recent Massachusetts manœuvres, driven by Fred Robinson, on Tuesday, August 17, the rainiest day of the campaign, carried 6,000 pounds of beef a distance of more than 71 miles from the headquarters at Fair Haven to a point far to the north of Middleboro. The trip was made during the night, and such deep ruts were encountered that pebbles and rocks continually caught between the chains and rear sprockets, yet both of the chains remained undamaged. The deep mud at times stalled the car, but it extricated itself always without external assistance. The car also hauled heavy loads of baled hay. The truck was also used as a sort of hospital wagon. Hundreds of the troops on the march toward Boston were disabled with swollen feet and knees. and many of these were carried on the truck. In six days the truck covered 422 miles, generally heavily loaded, and under very unfavorable road conditions.

The Packard truck in the Blue Army carried a one pound Hotchkiss rapid fire gun. It is claimed that such a gun when mounted on a motor truck is much more dependable than when drawn by horses.

### Business Opportunities.

The cities of Beloit and Janesville, Wis., are planning to purchase motor fire engines, following the example set by the Rockford (Ill.) Common Council. The chiefs of these cities, which are close together, believe that with each department so equipped co-operation could be established.

The Milwaukee (Wis.) Common Council is considering a resolution appropriating \$4,500 for a new touring car for the chief of the fire department and \$1,000 for a runabout for the commissioner of public health. Objection has been made to the discrepancy between the appropriations, and it is likely that the sum designated for the health department will be increased.

We have an inquiry from a reader living in North Dakota as to who makes a four cylinder, shaft driven car, with 36 inch and 38 inch wheels, with solid tires, about 15 inch clearance, and either one or two seats; made somewhat like the Chase runabout, only with shaft drive. We do not know of any such cars on the market, but if any of our readers is in position to furnish it we shall be glad to forward his address to the inquirer.

The Milwaukee Board of Fire Underwriters, according to Frank J. Meyer, president, will purchase a motor insurance patrol truck before January I. The board has only three insurance patrol stations, and it is believed that with a motor truck the territory now practically unprotected can be covered without building a new station. C. F. Hibbard, chairman of the patrol committee, is in Europe, and on his return in another month the matter will be pushed.

# Commercial Applications.



# Motor Bus Lines at Asbury Park.

Two different companies are running motor bus lines this summer from Asbury Park to nearby points of scenic beauty.

Roads in this section of New Jersey are generally good, and some of the finest suburban residences in the country line the highway for miles along the shore and inland in many directions.

Rogers Red Line has two Rapid twelve passenger and one Mack twenty passenger bus in service between Asbury Park and Lakewood (50 miles), and Asbury Park and the Rumson Road (35 miles). Trips are made daily to these two points, and in some cases an additional trip is made to the Rumson Road.

The Royal Gray Line competes with the Rogers Line with three twenty to thirty-five passenger Mack machines, adding also a special trip to Bay Head at an increased fare of \$2.50 per passenger. The fare to Lakewood is \$2 per passenger, and to the Rumson Road \$1.50 per head.

The buses are also chartered to parties for special excursions.

The Silken Motor Company of New York has a number of town cars on hire at the leading hotels during the two months' season from July 1 to early September.

# Taxicabs on the Jersey Shore,

The New York Taxicab Company are now operating about two dozen taxicabs at their Elberon, N. J., branch, garaging them at the Sea Shore Garage. Most of their work is done in the evening, parties renting the cabs for runs to nearby country restaurants, as well as for attendance at social functions.

The Autocar Service Company, 403 Munroe avenue, Asbury, Park, N. J., have fifteen automobiles in the livery business, including taxicabs, station cars and touring cars. Rates to any address in Asbury Park are 25 cents per passenger. By the hour charges are as follows: Taxicab, \$3 per hour; waiting time, \$1.50 per hour. Station car, \$5 per hour; waiting time, \$2.50 per hour. Touring car, \$5 per hour; waiting time, \$2.50 per hour.

M. E. Sexton, a livery stable keeper of 401 Munroe avenue, Asbury Park, has also put in a few taxicabs recently and expects to purchase more of them.

# Commercial Notes.

The Imperial Valley Transportation Company, which was recently incorporated at Imperial, Cal., by F. C. Paulin, Geo. P. Blair and others, has placed an order for twelve nine passenger motor stages, of which the three first have already been received. In addition to carrying nine passengers the vehicles will carry a ton and

a half of freight, and the company will take orders from business houses on their run to the city and deliver the goods on the return trip. The company also intend to carry pupils to school.

G. C. Thaies, of Oxnard, Cal., has started a motor service between Nordhoff, Ventura and Oxnard with a high powered touring car. The train service between these points is said to leave much to be desired.

Automobiles will be used for the collection of mail at Los Angeles, Cal., according to a letter from the Postmaster General recently received by Postmaster Flint, of Los Angeles, if contracts can be let at reasonable terms.

The Eastern Auto Transit Company, Schenectady, N. Y., has placed an order for ten motor buses. The first of the cars was placed in service between Schenectady and Altamont on August 11. Three round trips are to be made every day.

An automobile stage line has been in augurated between Las Vegas and Santa Rosa, N. M. The cars which also carry the mail between Las Vegas and Anton Chico, Casaus and Colonias are said to be a marked improvement over the horse stage line.

T. J. Burrow, Jr., representing H. Thorpe & Co., of Jackson, Amador County, Cal., has let the contract for two White steamers for the Stockton-Jackson motor stage line. One of the cars is a seven passenger and the other a five passenger one. The service will be started immediately.

Lou Fox and Geo. Morris have decided to establish an automobile service between Nevada City and Sierra City, Cal. The company employs seven passenger touring cars, and its route includes the towns of North San Juan, Camptonville, Mountain House, Forest City, Alleghany, Goodyear Bar and Downieville.

The City Council of Redlands, Cal., has delegated its fire department committee to make an investigation of the motor fire engine question. The committee will make trips to Los Angeles, Hollywood and Long Beah to inspect the motor propelled fire vehicles there, and will then confer with builders of such vehicles. At a recent meeting of the council opinion seemed to be almost unanimous that no more horses should be bought for the fire service, as Redlands is a very hilly city, and a horse equipment is almost useless for fighting a fire on the heights, as it takes too long to get there.

The Plainfield (N. J.) Auto Bus Company, which was mentioned a number of times in our columns several months ago, has started its service between Plainfield, South Plainfield, Oak Tree and Metuchen. The roads along the route covered are all macadamized, and there are no railroad crossings. The buses which have been placed in service carry fourteen passengers each. The company will have two of these buses in regular operation and a third one in reserve for outings, etc. The officers of the company are: A. E. Force, president;

Wm. Newcorn, vice president; Fred A. Duttenhofer, secretary, and Isaac Schwed, treasurer.

# Rules and Plans of Atlanta Show Announced.

Applications for space and diagrams of the Atlanta National Automobile Show, Atlanta, Ga., November 6 to 13, 1909, under the management of Samuel A. Miles, general manager National Association of Automobile Manufacturers, and Alfred Reeves, general manager American Motor Car Manufacturers' Association, have been mailed to all makers of motor cars and accessories. The Southern show will be held in the Auditorium-Armory, which by the removal of various partitions gives the management 65,000 square feet of floor space.

Applications for space to be considered in the first allotment must be received at the headquarters of the National Association of Automobile Manufacturers, 7 East Forty-second street, New York, by Saturday, September 4. No application after that date will be considered until all applicants up to that time have been taken care of. The first allotment of space will take place at the office of the N. A. A. M. at 3 o'clock, Wednesday, September 8.

The Auditorium-Armory, where the exhibition will be held, is one of the largest exhibition buildings in the South. It is owned by the city of Atlanta and since its erection has been used for some of the largest conventions held in the South. During the automobile show the new automobile track now being constructed will be opened, and endurance contests through the various sections of Georgia will be held, with prizes for the best stretches of road, and a reliability trip from New York to the enterprising Southern city is being planned.

Working in conjunction with Messs. Miles and Reeves are Asa G. Candler, president of the Atlanta Chamber of Commerce; John S. Cohen, Clark Howell, E. W. Gans, S. C. Dobbs, C. R. Ryan, E. M. Hanson, J. T. Fitten and others.

# New Brush Factory.

Finding their present quarters inadequate to supply their growing trade, the Brush Runabout Company have decided to build a new factory in the northern part of Detroit. A large site has been purchased between Oakland avenue and the Grand Trunk R. R. The plans provide for a 636x 200 foot machine shop, a 150x80 foot office building, a 288x200 foot paint and finishing shop and a foundry and an experimental building.

### To Build 200 Moyer Cars.

H. A. Moyer, the well known carriage builder of Syracuse, N. Y., will manufacture a \$1,500 and a \$2,000 car, limiting himself to about 200 the first year, and marketing them through the agents who handle his carriages.



# Recent Decisions.

OUESTION FOR THE TURY.

The question as to the negligence of an employee using a motor car on a railroad track, where he was killed by a train following, was held to be one for the jury.-Yeandle vs. Pennsylvania R. R. Co., N. J. Cir. Ct. App.; 169 Fed. Rep., 938.

# CONTRIBUTORY NEGLIGENCE PREVENTS RE-COVERY.

In a collision between a street car and an automobile, it was held that a recovery could not be had where the auto ran against the street car, and the driver of the auto was held guilty of contributory negligence. -McCreery vs. United Rys. Co., Mo., 120 S. W., 24.

MISTAKE OF FLAGMAN SUSTAINS VERDICT.

The invitation of a flagman to the driver of an automobile to cross the railroad tracks, thereby causing his death, was held to be sufficient to sustain a verdict of \$7.000 damages for loss of life, which was held not excessive where plaintiff's intestate was thirty-five years of age and earning \$18 a week.-La Belle vs. Rhode Island Company, R. I., 73 Atl., 306.

#### Suggested Amendments to Ohio Law.

Fred H. Caley, Ohio State Registrar of Automobiles, announces that he will make recommendations for only two amendments to the present State automobile law when the next General Assembly convenes. It is believed that Ohio's law is almost perfect except in the two particulars which it is proposed to remedy. One of the amendments will permit an owner to transfer his license and set of tags from one motor car to another when he sells his first. This can be done through the State Department by the payment of a nominal fee. At present every car must be licensed by every one of its owners. The other amendment will provide for an examination for the licensing of chauffeurs. It is thought the amendments will be incorporated in the present law and that no other changes will be made.

### Supplementary Spiral Spring Patent Suit.

The Supplementary Spiral Spring Company, 4524 Delmar avenue, St. Louis, Mo., have filed a suit in the United States Circuit Court at New York city against M. H. Cormack & Co., Inc., and M. H. Cormack personally, of Motor Mart Building, 1876 Broadway, New York, for alleged infringement of their patents, Nos. 807,612, dated December 19, 1905, and 901,578, dated October 20, 1908.

M. H. Cormack was formerly the New

York representative of the Supplementary Spiral Spring Company, but some time ago severed his connection with that company and organized M. H. Cormack & Co., Inc., to manufacture spiral springs under license from J. H. Graham, of Boston, who claims to be the original inventor of supplementary spiral springs. Graham's patents are Nos. 503,044, 555,857 and 570,473, granted August 8, 1893; March 3, 1896, and November 3, 1896, respectively. Graham in his patent specifications described his invention as applicable to car trucks, but now claims that it covers application to automobiles as well. We are informed that an interference case is now pending in the United States Patent Office to determine this point.

### Road Hog Gets His Deserts.

Ernest Novak, a farmer of Racine County, Wis., was found guilty of maliciously obstructing and blockading a public highway and fined \$10 and costs in the Racine Municipal Court. The complaint was made by Henry Plow, of the Mitchell Motor Car Company, of Racine, who charged that on August 8. while returning from Milwaukee with a party of three ladies and his driver, Novak refused to permit him to pass and drove his horse in a manner that unduly blockaded the highway. A snail's pace was kept up for fifty-five minutes, a distance of only 5 miles being covered by both horse and touring car. Each time Mr. Plow attempted to pass Novak drove his horse across the highway. This is the first case of this kind to come before a Wisconsin court. The defendant has appealed to the Circuit Court.

# Alleged Abuse of New Jersey Non-Resident Exemption Provision.

The Atlantic City, N. J., Press prints an editorial in bold face type in which it asserts that the liberal provision of the New Jersey law permitting non-resident motorists to use the roads of the State for a limited period at a nominal cost is being abused by these motorists, and that the Legislature at its meeting next winter may be compelled to make certain changes in the law. The paper goes on to state that it has been found that tourists' licenses are frequently purchased by Philadelphia and New York people early in the season, and then used once or twice a week until each of the days of permission is cancelled. In this way the tourists can buy a ticket early in the season and go to a New Jersey resort each Sunday for two months and enjoy for \$1 the same privileges as others enjoy practically for the full license, which costs them

It is certainly not clear of what the alleged abuse consists, unless it is considered an abuse of the privilege granted by the law to leave New Jersey resorts after a stay of only one or two days. The law specifically provides that a non-resident holding one of these special licenses may use the roads of the State for four periods of two days each in one calendar year, or one period of eight days in one calendar year. It would seem from the above that the "four periods of two days each" privilege is objected to.

Sentenced for Robbing Garage. Robert Taintor, of Viroqua, Wis., a college student employed by the Holway Auto Garage, Fifth and State streets, La Crosse, Wis., as a helper, was sentenced to serve three years in the State reformatory for robbing the garage of \$50 and then setting fire to the office to cover the crime. The fire was extinguished before it reached the garage department.

# Legal Notes.

The automobile tax law which had been pending before the Georgia State Legislature for some time, and which imposed a tax of \$5 annually on automobile owners, has been killed.

The city of Kenosha, Wis., will adopt a "rules-of-the-road" ordinance at the next meeting of the common council. Since January I nearly all of the larger-cities of Wisconsin have adopted the code.

E. S. Esterly, a jeweler of Duluth, Minn., was recently fined \$10 for stationing his automobile in the street with a sign attached announcing that it was for hire, and refusing to remove it when ordered to do so by a patrolman. Esterly appealed the case to the District Court.

The position of chauffeur has been placed in the New York State non-competitive list by a civil resolution approved by Governor Hughes. The application for the exemption of the position was made by the State Highway Commission, which has recently bought four automobiles. The salary is \$100 a month. This is the first time the position has been recognized in the State service.

The County Board of Tax Equalization of Atlantic County, N. J., has discovered that not a single automobile or motor boat in Atlantic City is being taxed, although automobiles and motor boats to the estimated value of \$450,000 are owned in the city. None are mentioned in the assessment lists. It is proposed to put on additional assessors or assessors' clerks, and get every car in the city on the list.

# Contract for Ohio License Tags.

The automobile registration bureau of the Ohio Secretary of State's office will in the near future-probably in September-advertise for bids for 25,000 enameled number plates for automobiles. Last year the samples submitted were examined by Ohio State University as to their workmanship, lustre, solubility in water, solubility in dilute acid, effect on them of acid and acid gases, and the amount of bending or blows they would stand without cracking or breaking. It is presumed the same tests will be made this year.

# The Inaugural Races on the Indianapolis Speedway.

Several new track records, from I to 200 miles, were made at the three days' meet held on the Indianapolis Motor Speedway near Indianapolis, August 19-20-21. William A. Bourque, driver, and Harry Holcomb, his mechanic, both of Springfield, Mass., who had one of the Knox entries, were killed on the opening day of the meet, and three spectators were killed on the closing day.

The deaths of Bourque and Holcomb occurred during the 250 mile race on Thursday for the Prest-O-Lite trophy. The cause of the accident could not be determined, but witnesses said both men looked back and the car ran into an open ditch along the home stretch, turning over. Holcomb was thrown against a post and killed instantly. Bourque died within fifteen minutes.

There were rumors after the first accident that the 2½ mile course, upon which the events were run, was not in fit condition for the speed tests that were undertaken. On Friday morning officials of the A. A. A. made a trip around the track, ordered a few changes, and the ditch covered and gave sanction to the races.

There were rumors that the 300 mile race would be cut shorter, or that drivers would be changed, but it was decided to carry it out according to the program. In his 190th mile Charles Merz, a twenty-one year old boy driving a National, crashed into the fence, instantly killing William Kellogg, Benjamin Logan and H. H. Jolleffe, all of Indianapolis. Merz miraculously escaped with a few scratches, while his mechanician was probably fatally injured.

Directly after this accident Bruce Keene, driving a Marmon, crashed into the overhead bridge over the track. Keene and his mechanician were slightly hurt. It was seen the drivers were in no condition to continue, and in the ninety-fourth lap the A. A. A. officials called the race off. The leading car at that time was a Jackson, driven by Lynch, with De Palma in his Fiat second, and Stillman, driving a Marmon, third.

Only half of the 5 mile course has been completed. While the track in front of the grand stand and for some distance each way was oiled, the remainder of the track was covered with fine stone particles, which frequently broke the drivers' goggles and gave them intense pain. Chevrolet, driving a Buick, was obliged to get out of the 250 mile race because he was almost blinded.

The crowds at the races were all that could have been expected, about 12,000 attending the opening day, 22,000 on Friday and about 30,000 on Saturday. From a financial standpoint the meet was a success. It is understood another meet will be held next month or in October.

The results of the races for each day were as follows:

### THURSDAY.

Event No. 1—Five mile stripped chassis, Class 4, 161 to 230 cu. in. piston displacement: Schwitzer, driving Stoddard-Dayton, first; time, 5:13.4.

Wright, Stoddard-Dayton, second, and De Witt, driving Buick, third.

Event No. 2—Ten miles stripped chassis, Class 3, 231 to 300 cu. in. piston displacement: Chevrolet, driving Buick, first; time, 8:56.4. Strang, driving Buick, second, and Burman, driving Buick, third.

Event No. 3—Five mile stripped chassis, Class 2, 301 to 450 cu. in. piston displacement: Bourque, driving Knox, first; time, 4:45.5. Burman, driving Buick, second, and Chevrolet, driving Buick, third.

Event No. 4—Ten mile free tor all: Harroun, driving Marmon, first; time, 8:22.5. Lynch, driving Jackson, second, and Aitken, driving National, third

Event No. 5—250 mile stripped chassis, 301 to 450 cu. in. piston displacement: Burman, driving Buick, first; time, 4:33:57.4. Clemens, driving Stoddard-Dayton, second, and Merz, driving National. third.

Exhibition mile by Barney Oldfield, driving Benz, :43.1; fastest mile during meet, and breaking former circular track record of :48.2, held by Webb Jay.

#### FRIDAY.

Event No. 1—One mile trials: Oldfield, driving Benz, :43.1; Zengle, driving Chadwick, :49.3; De Palma, driving Fiat, :46.6.

Event No. 2—Five miles for cars of 231 to 300 cu. in. piston displacement: Strang, driving Buick, first; time, 4:48. Chevrolet, driving Buick, second, and Stutz, driving Marion, third.

Event No. 3—Ten mile stripped chassis, 301 to 450 cu. in. piston displacement: Merz, driving National, first; time, 9:16.3. Chevrolet, driving Buick, second, and De Hymel, driving Stoddard-Dayton, third.

Event No. 4—Ten miles for cars to compete for Wheeler & Schebler trophy, under 600 cu. in. piston displacement: Aitken, driving National, first; time, 9:26.6. Lytle, driving Apperson, second, and Heina, driving Lozier, third.

Event No. 5—Fifty mile stripped chassis, 161 to 230 cu. in. piston displacement: Wright, driving Stoddard-Dayton, first; time, 59:23.1. Schwitzer, driving Stoddard-Dayton, second.

Event No. 6—Ten mile, free for all, open, Class E: Zengle, driving Chadwick, first; time, 8:23.2; Aitken, driving National, second, and Ford, driving Stearns, third.

Event No. 7—Five mile, free for all handicap: Aitken, driving National, ten seconds handicap, first; time, 4:25. Merz, driving National, twenty seconds handicap, second, and Clemena, driving Stoddard-Dayton, thirty seconds handicap, third.

Event No. 8—100 miles stripped chassis, 231 to 300 cu. in. piston displacement, for G & J trophy: Strang, driving Buick, first; time, 1:32:48.5, breaking former record of 1:44 held by Burman, and made at Columbus, Ohio, July 3. De Witt, driving Buick, second, and Stillman, driving Marmon, third. The twenty, thirty, forty, fifty, sixty, seventy, eighty and ninety mile records were also broken during the race by Strang.

SATURDAY.

Event No. 1—Trials to lower kilometer record: Christie, driving Christie, :28.7; Zengle, driving Chadwick, :29.9; Oldfield, driving Benz, :26.2; the kilometer record is held by Chevrolet, and was made in :19 2-5 at Ormond Beach in a 200 h. p. Darracq, January 25, 1906.

Event No. 2—Fifteen miles free for all handicap: De Palma, driving Fiat, scratch, first; time, 13:23.5. Kincaid, driving National, handicap one minute and fifteen seconds, second, and De Witt, driving Buick, handicap two minutes and fifteen seconds, third.

Event No. 3—Twenty-five mile free for all for Remy Brassard and weekly salary of \$75 as long as winner holds title: Oldfield, driving Benz, first; time, 21:21.7, lowering five, ten, fifteen and twenty mile records, and twenty-five mile record of 23:25, held by De Palma.

Event No. 4—Ten miles for amateur championship of America: Hearne, driving a Fiat, first; time, 9:44.3. Ryall, driving Buick, second.

Event No. 5-300 mile stripped chassis, under 600 cu. in. piston displacement, for Indianapolis Motor Speedway Trophy, valued at \$7,500, donated by Wheeler & Schebler. Not finished.

# The Moline Protest Against the Award of the Hower Trophy.

After refraining from a discussion of the subject for the past few weeks, W. H. Van Der Voort, president of the Moline Automobile Company, has issued a statement concerning his protest against the awarding of the Hower trophy to the Pierce car in the recent Glidden Tour. Mr. Van Der Voort does not wish it to be thought that his protest was merely on the matter of carrying a tail light. He says in part:

"Noting that an erroneous report has gone out to the effect that Moline car, 101, was protesting the decision on the grounds of Pierce car, 108, not carrying a tail light, we feel that this impression should be corrected. Pierce car, 108, did carry its tail light, and my protest is based upon the fact that this tail lamp was completely demolished and the bracket considerably bent.

"Penalties were provided for deterioration, and according to the rules car 108 should have been penalized to the extent of the price of a new lamp and the labor required to straighten the tail lamp bracket. Moline car, 101, was required to light its oil lamps, proving condition. This would have been impossible with car 108, as the tail lamp was entirely inoperative.

"On the basis of material and labor in repairing the bracket, and replacing the lamp, it would alter the final score in my favor.

"I have no criticism whatever as to the findings of the committee upon penalties which were imposed upon Moline entry, 101, and while the crushing of the tail lamp and the bending of its bracket may appear trifling, I feel that the tightening of the three spring clip nuts, and the furnishing of one 1/4x1 inch cap screw, and one 1/4x1 inch step bolt, upon which our penalties were levied, are, from the operative standpoint, of very much less importance."

### Load Burned-Truck Saved.

A motor furniture delivery truck, belonging to R. J. Horner & Co., New York, caught fire as it was being driven out to Hastings-on-the-Hudson last Saturday morning. The driver was apprized of the fire by people looking and pointing at the truck, till he realized something must be wrong. He was driving at about 12 miles per hour at the time. The entire body back of the driver's seat, and the contents, consisting of about \$1,100 worth of furniture, were consumed, but the chassis was practically uninjured and was driven back to New York under its own power. It is supposed that the driver or the helper was smoking, and that the sparks from the cigar ignited the inflammable material with which the furniture was packed, but the driver denies this, and says he has no idea how the fire originated. The fact that the gasoline tank was intact and the chassis uninjured would seem to prove that the fire was in no way due to gasoline or anything about the mechanism of the truck.

# MINOR MENTION



The Hendee Manufacturing Company, Springfield, Mass., manufacturers of Indian motorcycles, have adopted the Bosch magneto for their 1910 output.

The Yuba Construction Company, Yuba City, Cal., who have been manufacturing dredging machinery, have decided to engage in the manufacture of automobiles.

The Johns-Manville Company, 100 William street, New York, furnish a fireproof, weatherproof siding, called Asbestoside, which they recommend as specially adapted to garages.

During the week ending August 14 the following cars led in the registrations in New Jersey: Oldsmobile, 11; Maxwell, 10; Ford, 9; Buick, 8; Reo and Cadillac, 6 each; Pope lines, 5.

The Darby Motor Car Company, St. Louis, Mo., has removed to 530-32 De Baliveire avenue, and will shortly begin the manufacture of the Darby car on an increased scale.

Howard W. Brown, of the Binghamton (N. Y.) Motor Car Company, plans to establish a wholesale supply business in connection with his new garage, which will be completed some time next winter.

The Milwaukee Prest-O-Lite Company has been formed in Milwaukee, Wis., and headquarters have been established at 192 Fifth street. Walter L. Ebert is manager. A recharging station has been installed.

At the plant of the E-M-F Company in Port Huron, Mich., nearly 300 men are employed at the present time, and arrangements are being made for erecting a large power plant in connection with the factory.

The Middletown (Ohio) Buggy Company will take up the manufacture of motor delivery wagons on September 1. Much new machinery has recently been installed, and considerable capital will be invested in the new venture.

The executive officers of the Studebaker Automobile Company will shortly be transferred from Cleveland to South Bend, Ind. The personnel of the organization remains the same. The company will maintain its Ohio branch in Cleveland.

John S. Taylor, of Logansport, Ind., has invented a vehicle hub which is said to be absolutely dustproof and impossible to come off the axle. Mr. Taylor is at present in Spokane, Wash., and may organize a company there to manufacture his hub.

The American Napier Automobile Company is at present preparing at its Jamaica Plain, Mass., factory for the manufacture of 200 town cars. The factory will be in charge of H. Kerr Thomas. S. F. Edge is at present in this country assisting in getting the work under way, and it is stated that both Mr. Edge and Mr. Napier will spend part of each year at the American

factory superintending the business and mechanical operations respectively.

The Prest-O-Lite Gas Company, Los Angeles, Cal., have purchased a 100x200 foot plot on the south side of Lacy street, near Avenue 26, on which they will erect a building to serve as a recharging plant for Prest-O-Lite gas tanks.

John H. Kelly, of Chicago, has been appointed trustee of the Chicago Vulcanizing Company to conserve the assets and continue the business for the benefit of creditors. An inventory of the assets is now being taken, and a statement will be sent to all creditors in the near future.

It is predicted that Cleveland's automobile centre will within another year be established on lower East Ninth street, north of Superior avenue Northwest. Most of the sales establishments in the city are now located on Euclid avenue, but rents there, in the vicinity of the shopping district, are constantly rising.

Thomas Forbes, a former Minneapolis insurance agent, has invented a revolving cylinder gasoline motor, and is organizing the Los Angeles Rotary Engine Company in Los Angeles, Cal., for its exploitation. The engine has five radial air cooled cylinders which revolve around a central stationary crank shaft.

According to a report from Harrisburg, Pa., the authorities of that State are convinced that macadam roads are quickly destroyed by automobile traffic, and they plan to pave the roads with firebrick in the future. This form of road would be quite expensive in the first place, but would cost little to keep in repair.

The National Motor Supply Company has been organized at Cleveland, Ohio, with a capital stock of \$10,000, to manufacture a variety of automobile and motor boat supplies, principally steam vulcanizers and gasoline gauges. V. H. Meyer, who was formerly connected with the B. F. Goodrich Company, of Akron, Ohio, will be manager.

The Maxwell-Briscoe Motor Vehicle Company, of St. Louis, Mo., will open an accessories branch in connection with their downtown salesroom at an early date. M. W. Doyle, formerly in charge of the accessories department of the Buick Motor Company, will have charge of the new department. A complete line of supplies will be carried.

The supply dealers and jobbers of Kansas City, Mo., held a meeting on August 12 at the Coates House to take preliminary steps toward the organization of a local dealer's association. It seems that, the same as in other cities, the fact that certain jobbers also do a retail business has created more or less friction with firms who do a retail business only.

During the week ending August 14 the following cars headed the list of registrations in New York State: Ford, 41; Maxwell, 29; Cadillac, 27; Buick, 25; E-M-F, 19; Packard, 19; Reo, 15; Overland, 12; Stevens-Duryea, 11; Franklin, 10; Olds, Winton and Palmer & Singer, 9 each; Auto-

car, Locomobile and Peerless, 8 each; Rambler, Mitchell and Stoddard-Dayton, 7 each.

During the month of July, 1909, there were imported at the port of New York by dealers 82 pleasure cars, 38 taxicabs and 1 motor truck, aside from 45 old cars imported by individual owners, and 8 new cars. Of the 82 pleasure cars imported by dealers, 22 were Fiat, 20 Renault, 9 Mercedes, 9 Delaunay-Belleville, 8 Benz, 3 Hotchkiss and 3 De Dion, and of the 38 taxicabs imported, 17 were Renault, 10 Lancia and 10 Fiat.

Edward C. Huhn, Philadelphia manager of the Puritan Soap Company, of Rochester, N. Y., recommends that for washing cars 20 pounds of soap be dissolved in 25 gallons of water, and this solution used with water as occasion demands. He asserts that this will result in a saving of 25 per cent. in the soap bills of garages and automobile companies, as compared with where large pieces of soap are used on a sponge for making a lather.

The old Guttenberg race track at Guttenberg, N. J., where one of the first automobile races in the country was held in 1900, has passed under the control of the Palisades Amusement Company, and an inaugural meeting will be held on the track on Labor Day, September 6, the feature being a 300 mile race. A twenty-four hour race is planned for September 11. The track consists of a mile oval, with a straightaway course, but it is to be enlarged into a 2 mile circuit.

So many automobiles use the ferry across Long Island Sound, between Rye and Sea Cliff, that the ferryboat Englewood, which was chartered from the Fort Lee Ferry Company, has proven entirely inadequate, and the Oakland Steamboat Company, the owners of the ferry service, have just placed an order for a new two propeller double end ferryboat, which will carry at least fifty automobiles. Work on the boat will be begun in October, and it will be ready for service early next spring.

A. Frederick Collins is conducting some experiments to determine the availability of wireless telephoning for automobilists in communicating with a garage or a relief station. So far the results have been rather unsatisfactory. Mr. Collins was able to communicate over a short distance with a garage in Newark, N. J., but at a distance of 8 miles the apparatus failed. The difficulty is said to be due to the fact that only short antennæ can be used, and a great amount of energy must be expended to transmit the signal only a short distance,

It is reported that a number of the large Eastern railroads, including the Baltimore & Ohio and the Pennsylvania, are being equipped with special baggage cars for the accommodation of wealthy automobilists who wish to take their cars with them to distant parts of the country. These baggage cars are provided with a door in the end of sufficient width to permit of the entrance of a large touring car. In loading the cars the automobiles are placed on

skids and run into the end before the auto coach is coupled to the train. It is said that the New York Central has also ordered fifty of these auto baggage cars.

The Jewel Company, Carthage, Ohio, are to turn out a \$1,500 car for 1910.

The Auto Supply Company, 1326 Vine street, Philadelphia, have secured the agency for Home tires, made in Trenton, N. J.

The Federal tire is now represented in Philadelphia by the Auto Exchange, at 1437 Vine street, who have the exclusive agency for Pennsylvania.

The Deranie Motor Company, 7500 Quincy avenue, Cleveland, Ohio, will build this season twenty-five \$4,000 cars, equipped with two cycle motors.

The Selden Car Company of Pennsylvania opened show rooms at 352 North Broad street, Philadelphia during the past week, and handle the Selden car.

The Empire Tire Company, of Trenton, N. J., has opened a direct branch, corner Broad and Woods streets, Philadelphia. The branch is in charge of E. B. Richardson.

The Apperson car which recently established a new speed record in California, covering 202 miles at an average speed of 64.45 miles per hour, was fitted with New Departure ball bearings.

The Coppock Motor Car Company, of Decaur, Ind., will issue \$100,000 worth of 6 per cent. bonds, giving bondholders the privilege of exchanging the bonds for stock within eighteen months after the date of issue.

Employees of the Mitchell Motor Car Company, Racine Manufacturing Company, Pierce Motor Car Company and Piggins Brothers Company, of Racine, Wis., and Thomas B. Jeffery & Co., of Kenosha, Wis., held their first annual joint picnic at Central Park, Racine, on August 22.

Ben Loy, a racing driver, was killed on the Cheyenne motor race track on August 14, owing to a collision between his racing car and a cow. His mechanic, Shannon Lees, was also thrown out of the car, and had to be taken to a hospital, but his injuries are said to be not serious. Loy was employed by R. J. McCarthy, of Denver, Col.

The Auto Sales Company has been organized at Appleton, Wis., by a number of business men to sell motor vehicles, equipment, supplies and accessories in the Fox River valley. The company has contracted for the agency for the Kisselkar in that territory. Herman G. Saecker is president, J. L. Wolf vice president, P. M. Conkey secretary, Samuel J. Ryan treasurer.

The Badger Automobile Company, of Columbus, Wis., has started work on the erection of its factory. The building will have dimensions of 50x150 feet, two stories high, of solid brick construction. The entire floor space will be unobstructed, excepting for walls of the various department rooms. The Milwaukee road has afforded sidetrack fa-

cilities direct to the shops. The company expects to occupy the factory about November I.

#### Club Notes.

The Cornwallis A. C. is to be organized at Cornwallis, Ore., where quite a number of machines have been sold recently. The movement is being promoted by S. L. Kline.

Automobile owners of East St. Louis, Ill., held a meeting at the Elks Club rooms on August 13, with the object of organizing an automobile club. The object of organization is to suppress speeding in the locality and to join the State Association.

Automobile owners of Abilene, Kan., organized an automobile club at a meeting held on August 9. The following officers were elected: C. M. Harger, president; E. H. Forney, vice president, and J. T. Nicolay, secretary and treasurer.

The Lake Placid Club, Lake Placid, N. Y., is building a garage that will accommodate sixteen automobiles. This is an addition to a smaller garage, accommodating eight machines, that was erected several years ago. The new garage will have a cement floor, a repair shop and a pit.

The Automobile Club of New Rochelle, N. Y., was organized at a meeting held on August 20, with a charter membership of fifty. E. T. Birdsall was elected president, W. B. Ogden first vice president, J. A. Scofield second vice president, F. M. Carpenter secretary, and F. D. LeCount treasurer. It is said that there are 250 owners in the city.

To Wind Up Grout Automobile Company.

Receivers E. S. Hall and David Walsh, of the Grout Brothers Automobile Company, Orange, Mass., have petitioned the Superior Court for permission to sell the plant and to be released from the receivership. They were appointed by Judge Hitchcock in July, 1907.

# Garage Notes.

The Eastern Motor Car Co., Los Angeles, Cal., will shortly move into their new garage on South Olive street.

The Los Angeles, Cal., Stoddard-Dayton Motor Co. has moved into its new garage at Tenth and Olive streets.

Holloway & Patterson, district agents for the Buick at Janesville, Wis., now occupy their new garage. The firm has ordered fifty 1910 models. Chas. H. Thompson, who handles the Jackson

Chas. H. Thompson, who handles the Jackson car in Los Angeles, Cal., has moved to new quarters at 1012 South Main street, vacated by the Stoddard-Dayton Motor Co.

The Lucia Cycle Co., of Green Bay, Wis., agent for the Thomas and Chalmers-Detroit and Hudson, has moved into its new garage. The company is establishing branches throughout northeastern Wisconsin.

E. J. Hahn, Aurora, Ill., will erect a two story garage and machine shop building. It will have a 30 foot frontage on West Second street. Mr. Hahn has been engaged in the auto repair business for some time, and has outgrown his present quarters.

The capital stock of the H. O. Harrison Co., Peerless agents in San Francisco and Los Angeles, has been increased from \$50,000 to \$100,000. The original allotment of 1910 cars for the two Harrison companies was seventy-five, but this was later increased to ninety, as the prospects for 1910 business on the Pacific Coast are said to be particularly bright.

The Cartercar Co., of Pontiac, Mich., have opened a sales office in Wichita, Kan., at 115 to 119 East Second street, in charge of F. P. Kreikenbaum, who formerly had charge of the company's Chicago salesroom.

Plummer Eaton and Howard Humes, of Tarentum, Pa., have formed a partnership, and will erect a garage on Second avenue, comprising also a repair shop. The new firm will handle the Hupmobile, Chalmers-Detroit and Hudson Twenty.

Henry G. Goosman has purchased a garage building at 215 and 217 Eighth street South, Minneapolis, Minn. The building is 55x200 feet, two stories high, and completely equipped for automobile repair work. Mr. Goosman handles the Speedwell car and does a general automobile repair business.

#### Trade Personals.

- P. A. Williams, Jr., sales manager of the Atlas Motor Car Co., Springfield, Mass., sailed for Bermuda on August 18, and expects to also visit Porto Rico.
- C. E. Reddig, who was formerly in the engineering department of the Electric Vehicle Co., Hartford, Conn., has been appointed assistant engineer of the Columbia Motor Car Co., successors to the Electric Vehicle Co.
- C. A. Erickson, recently with the American Locomotive Automobile Co., Providence, R. I., and formerly with the Electric Vehicle Co., of Hartford, Conn., is now chief draughtsman of the Palmer & Singer Manufacturing Co., New York.
- C. T. Paxon has been appointed manager of the newly established Chicago branch of the E. R. Thomas Motor Co. Mr. Paxon has been connected with the Thomas Co. since its organization, and managed the local sales department in Buffalo since 1904.
- since 1904.

  E. W. Carter, who has for some time past been in charge of the Boston office of the Hoyt Electrical Instrument Works, will hereafter be connected with the factory at Penacook, N. H., and A. K. Brown will succeed him in charge of the Boston office.
- F. G. Baender and P. S. Biegler, both of Iowa City, Ia., have recently moved to Spokane, Wash., where they will shortly open an agency for the White steamer. Messrs. Baender and Biegler formerly were instructors in mechanical and electrical engineering in the University of Iowa.

Fred Titus, for some years head salesman for the Harry S. Houpt Co., has just made an alliance with the sales force of the Palmer & Singer Manufacturing Co., and on September I will begin his new duties in the capacity of assistant sales manager in charge of out of town territory.

Charles F. Pougher, M. I. A. E., has resigned as manager, designer and organizer of the Simms Magneto Co. and the Simms Manufacturing Co., Ltd., London. Mr. Pougher was formerly works superintendent of the Birmingham Small Arms Co., Ltd., Birmingham, and designed the Enfield cars, which are well known in England.

New Incorporations.

The Citizens Automobile Co., Birmingham, Ala.—Capital stock, \$25,000. Incorporators, J. C. Turner, M. F. Hickman, H. G. Robinson and G. W. Yancey.

Bridge Web Tire Co. of Illinois, Chicago, Ill.—Capital, \$2,500. Incorporators, F. H. Drury, S. Lewis and E. H. Clegg.

South Texas Automobile Agency, Falls City, Tex.—Capital, \$3,000. Incorporators, C. D. Jauer, Hugh Knight and J. H. Sims.

Scott-Harris Engine and Transmission Co., Chicago, Ill.—Capital stock, \$100,000. Incorporators, P. Steele, S. M. Thein and R. W. Waugh.

Cornell Auto Salesroom, Los Angeles, Cal.— Capital stock, \$25,000. Incorporators, C. F. Grundy, Fred A. Cornell and J. R. Grundy.

Studebaker Colorado Vehicle Co., Denver, Col.—Capital stock, \$100,000. Incorporatora, W. S. Hunnewell, W. Scott Bicksler and Jesse M. Wheelock.

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# Babbitt Bearings.

BY S. M. UDALE.

I-ALLOYS.

The original alloy known as Babbitt metal was made of:

25 parts of tim, = 90.9 per cent. Sn. 2 parts of antimony, = 7.28 per cent. Sb. 2 part of copper, = 1.82 per cent. Cu. Thurston's "Alloys," Vol. III.

The name babbitt is now applied in America to a certain range of white antifriction metals. When the antimony is melted with an equal proportion of copper the babbitt is soft; when the antimony exceeds the copper, as in the original recipe, hard babbitt results. Antimony is a highly crystalline and very brittle metal which has the property of expanding on solidification. It imparts these properties to its alloys to a certain extent.

The latter property is of importance when casting a bearing in situ around the shaft or around a mandril substituted for the shaft.

Antimony will not oxidize in air. It burns, however, when heated, but the temperature in the ordinary bearing is seldom high enough for this.

> Antimony melts at 450° C. Tin melts at 228° C. Copper melts at 1,090° C.

It is to be noted that tin, which is present in by far the largest proportion of the three components in babbitt metal, melts at the lowest temperature. It is, although tin, ductile at ordinary temperature and may be cut with a knife; becomes brittle just before melting. This explains in part the slightly yellowish color of a burnt-out bearing—the copper not melting—and its brittleness. The white metal splashed all over the crank case upon the cam shaft, and under the piston, consists chiefly, if not entirely, of tin.

The coefficients of heat expansion of the component metals of babbitt are from 50 per cent. to 100 per cent. higher than the coefficient of heat expansion of steel, hence a side clearance of 0.005 is desirable, and the babbitt in the upper and the lower halves of the crank and main bearings should not touch, nor should the shims between the halves touch, the babbitt.

To illustrate the range of tin-antimonycopper alloys in actual use the following examples are given:

Name or Use,	Parts by Weight.								
	Tin.	Antimony.	Cop	per.					
	66,7	11.1	22.2	(8)					
English R. Rs	90	7	3	(0)					
(	85	10	.5	(d)					
French S. Rs	71	24	5	(e)					
Kamarsch	88.9	7.4	3,7	(5)					
	70	20	10	(E)					

It appears from the above that the tendency is to increase the proportion of antimony above that of the original babbitt to enable the bearing to carry a high load per square inch. Up to 2,000 pounds per square inch may be carried, but at the high speeds of automobile practice such loads are hardly safe for normal running. Other white metals suitable for use as bearings are:

Tin. Copper, +
White metal (zinc) .... 29,3 4.2 66.5% Zn, (4)
Nickel white metal.... 24,5 50 25,5 % Ni. (f)

The nickel alloys are used for the main bearings of two cycle engines having compression in the crank chamber. Such bearings are intended to wear like bronze or gun metal, so that little or no allowance need be made for taking up. Such a bearing is difficult to repair and it is better to replace it when worn. It wears a long time, however.

Lead babbitt is cheaper than the genuine article, but should be avoided. Being soft, the oil channels get clogged and lubrication is reduced in consequence, which is followed very quickly by a burnt-out bearing. Lead melts at 330° C., which is considerably higher than the melting point of tin, but the melting point of an alloy is not the arithmetic mean of the melting points of the component parts, taking into consideration the proportions in which they are present. This is well illustrated by the following example: Lead melts at 330° C., tin at 228° C., but an alloy containing 311/2 per cent. lead and 681/2 per cent. tin melts at 181° C. The variation of the melting point with the proportions of the components in the binary tin-lead alloy' is shown in Fig. 1.

Similar diagrams can be drawn for ternary alloys such as babbitt metal, only they are complicated and more difficult of interpretation. However, these "eutectics" are the key to the study of alloys. If a microscopic photograph be taken of a 30 per cent. tin and 70 per cent. lead alloy, small particles of lead are seen in a matrix of eutectic. In an alloy of 30 per cent, lead and 70 per cent, tin particles of tin are seen in a matrix of the same eutectic.

The theory of M. Charpy on the properties of anti-friction bearing metals is that the conditions demand that the material of the bearing should be both hard and plastic, which is impossible with a homogeneous alloy. (Homogeneous alloys are called solid solution.) Now, it so happens that the matrices (i. e., the eutectics) of these anti-friction alloys are softer than the precipitated particles. Hence they fulfill the requirements.

#### THE TRIANGLE DIAGRAM.

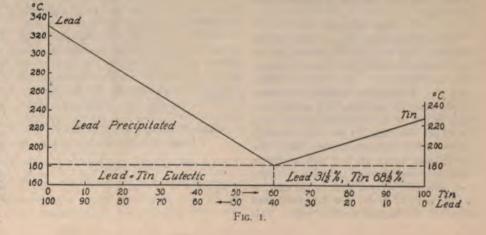
The study of the ternary alloys was much simplified by the use of a geometrical property of equilateral triangles. If from any point in an equilateral triangle, a b c, lines are drawn to the apices there are three triangles, a o c, o c b, and o b a, together equal to a b c. Triangles on the same base have areas proportional to their altitudes, hence:

a w = o x + o y = o z. And by similar triangles: a c = o c + o f + o g = a b = b c.

Hence every ternary alloy can be graphically represented by a point in the triangle. The alloys mentioned above are located

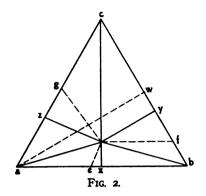
by this method on Fig. 3.

In Fig. 3 a' represents a babbitt metal formula, given in Unwin's "Machine Design," 1906 edition, and it is of interest to observe that a line joining a to a' includes



most of the babbitts suitable for automobile use.

An alloy identical with (f) is given in Kent as high duty babbitt. In experimenting with various proportions it is advisable not



to deviate much from the alloys represented by the line a-a'.

#### MANUFACTURE OF BABBITT.

Babbitt of a desired composition cannot be prepared by simply taking the three metals, tin, antimony and copper, in their predetermined proportions and melting them together.

The method generally adopted (Thurston's "Alloys," Vol. III) is as follows: To 12 parts of tin add 8 parts of antimony (regular) and melt together. Then add another 12 parts of tin. The pot is then removed from the fire and 4 parts of copper are added. This alloy is frequently sold in this form, but it is extremely brittle. One part of the alloy is therefore added to two parts of tin to prepare ordinary babbitt. This is the explanation of the "2 to 1" marked on babbitt bars.

Neglecting the oxidation loss of antimony and tin, the proportions thus obtained are:

```
12+12+72 parts of tin...... =88.9 per cent. of Sn.
8 parts of antimony. = 7.4 per cent. of Sb.
4 parts of copper.... = 8.7 per cent. of Cu.
=88.8 per cent. of Cu.
=88.9 per cent. of Sb.
= 4.0 per cent. of Cu.
```

Kent describes a process in which the reverse order is followed, the copper being first melted (12 parts), then tin added (36 parts), then antimony (24 parts), and finally 36 parts of tin. The heat is reduced when the copper is melted, and the surface is protected from the air to prevent undue oxidation of the antimony and tin. Fifty parts of this alloy are finally remelted with 100 of tin.

### LEAD ALLOYS.

Lead and antimony alloy together in any proportion, but the alloy containing 13 per cent. antimony melts at the lowest temperature, and hence is known as the eutectic (Fig 1). If the alloy contains more than 13 per cent. of antimony the excess antimony is present as crystallites embedded in the 87 per cent. lead. 13 per cent, antimony matrix, which is comparatively soft. The anti-friction alloys of lead and antimony, therefore, range from 15 per cent. to 25 per cent, antimony alloyed with 85 per cent. to 75 per cent. of lead. The last mentioned by has the highest melting point. This

alloy is quite a little cheaper than babbitt. The above explanation is due to M. Charpy. Lead babbitt is usually a normal babbitt, with half the tin replaced by the cheaper metal lead, e. g.:

Tin 45.5 per cent. + Lead 40 per cent. ⇒ 5.5 per cent.

Copper ..... = 1.5 per cent.

Antimony ..... = 18.0 per cent.

There are no simple geometrical diagrams to illustrate alloys made of four metals, and the amount of research work that has been done along this line is small. One objection to lead is that it is acted upon by oleic oils, that is, oils made from animal and vegetable fats. But as mineral oils are almost universally used this is not a serious matter.

The heat conductivity of lead is low, as compared with that of tin, and this is also a reason for not using lead. However, lead alloys have been successfully used for bearings in railway practice, but not for driving boxes. If sufficient area can be given to a bearing such alloys will show advantages over all others. In an automobile space is limited and the speeds are high, and babbitt is preferred.

PROPERTIES OF ANTI-FRICTION METAL BEAR-INGS.

First as to friction. The coefficient of friction depends only indirectly on the nature of the metals. It depends primarily on the nature of the lubricant, the supply and the temperature. If the metal of the bearing is soft the oil passages become restricted and thus affect the friction. White metal (babbitt, etc.) bearings run at a higher temperature than bronze bearings because (a) the metal is not continuous, and the heat has to be transferred from the

babbitt to the drop forged cap. The back of the babbitt is frequently not clean and the thermal resistance is thus much higher than it need be. In this connection cooling ribs should be placed both on the boxes themselves and on the crank case to radiate and conduct the heat away as quickly as possible. (b) The relative conductivity of babbitt is about one-half of that of bronze, hence the temperature drop in the thickness of metal separating the babbitt from the cap is twice as great for the same flow of heat as with a bronze bearing containing a large percentage of copper.

The bronze bearings are usually solid, but the connecting rod caps of automobile engines are of iron, which has exactly onesixth the conductivity of copper and onequarter the conductivity of bronze. Then, as mentioned above, there is the lack of continuity in the metals.

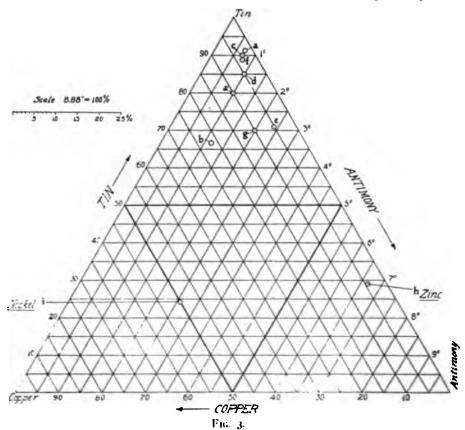
Aluminum caps, which are sometimes used on the main bearings, have twice the conductivity of iron ones. (c) The coefficient of friction of the metals has some slight effect, although the viscosity of the lubricant is of more importance. The following table gives the results of some comparative tests between babbitt and bronze in this respect:

	Bronze.	Babbitt.
Temperature	133° F.	1 <b>52°</b> F.
Coefficient of friction	0.010	0.013
Oil per hour, in oz	7	17

Thurston's "Friction and Lost Work."

As the same oil was used and the shafts were run at the same speed, it follows that any difference in the effects must be due to the metals.

The wear of the bearing takes place on



# The Economics of Motoring.

BY ALBERT L. CLOUGH.

the off side, and hence the lubricant should be fed in on the "on" side. With perfect lubrication there is an oil film of from 0.0005 inch to 0.001 inch, and hence there should be a diametrical clearance of from 0.001 inch to 0.002 inch. The wear depends on this clearance, but as the cap gets hotter than the crank shaft (as a rule) there is a certain amount of clearance due to expansion. Again, bronze and babbitt expand about twice as much as iron; a bronze bearing being solid, it is free to expand, whereas the babbitt in a bearing is not. Five-onethousandths of an inch end clearance should be allowed, as side wear is very likely to cause local overheating and thus start the metal to "burn."

Bearings for automobiles should be set up so that they can be moved laterally by one hand after being tapped with a lead hammer somewhat vigorously.

The wear on the bearings depends largely on the purity of the alloys, and special precautions should be taken to free the molten mass of metal from impurities. Fluxing with phosphorus is one means used for this purpose with bronzes.

With light oil lubrication there is a danger of having the crank pins so smooth that the oil film is never continuous. Where steel bears on steel the polish cannot be too high, but where steel bears on softer metals slight tool marks are an advantage.

Quantitative tests on wear are rare, and hence the following (locomotive) test is of interest:

Now that the motor car is being taken up, in a serious manner, by the moderately well to do classes, the economic side is being considered more than ever before, as bearing upon the type and class of car to be into account especially the use to which a automobile business as in human relationalmost as tragic. The effect of example is friend's requirements may be entirely different from those of the intending purway comparable.

In the ownership of an automobile two distinct sources of expense are met with,

purchased. There unquestionably ought always to be a close consideration upon the part of these intending purchasers, taking car is to be put, with the aim of making a choice which shall be satisfactory from the financial side. However, cars are often bought without any adequate deliberation of this kind. The intending purchaser is often captivated by some special point of a particular car, as explained by an able agent, and a purchase is made with little reference to the "main chance." Love at first sight is just as common a phenomenon in the ships, and its results are, on a small scale, also very strong. If a friend buys a certain make of car a strong incentive to purchase the same make is created, although the chaser, and his financial status may be in no

PERSON	PATTROPO	OT	PUREN	TOW
TWO	SOURCES	OF	EAPER	K S.E.

Bearing	Lead	Copper	Tin	Antimony	Cost per 100 Lbs.	Thousand Miles per Lb.	Wear Per Cent.
Gun Metal		83	17	42	\$28.50	25%	2.86
Babbitt I	4.	3	90	7	32,75	22	5.23
Babbitt 2		5	85	10	32.25	25	4.06
Lead Antimony,	84	**	25	16	13.00	23	4.40
				Thurs	ton's " Fric	tion and Lo	st Work."

Of course the figures for the cost of the metals vary greatly. They are intended to include cost of alloying, casting, etc.

One of the misleading properties of bearings is that the starting resistance is not always an indication of the permanent conditions of the bearings, but may be due simply to a temporary deficiency of lubrication. The practical application of this is that when a car has been standing with engine stalled for any time there is danger in immediately putting on a full load.

The German motor truck manufacturers are at present following the plan of establishing service corporations operating their trucks in the larger cities of the empire. Thus the Daimler Motor Company, of Marienfelde, has recently established such corporations in Breslau and Konigsberg, which start operations with five trucks each. The North German Automobile and Motor Company has also started a service with five trucks in Breslau, and E. Nacke, of Coswig, has organized a company to operate his trucks in the Kingdom of Saxony.

namely, the fixed charges and the operative charges. The former are inevitable concomitants of the possession of a car, and are but slightly dependent upon the extent to which it is used or how it is used (within reason). Most of the items which make up this class of expense are still incurred, whether or not the car is used at all, so long as it is in a person's possession in a condition ready for service.

The operative charge or the expense of operation is nil so long as the car is not used, and increases approximately with the extent to which the car is run. When the sum of the fixed charge and of the operative charge is a minimum for any particular period of service, the total cost of operation for that particular period is obviously a minimum, and when the sum of these two factors, per unit, of distance run, is at its lowest, the service thus obtained is secured at the least possible cost.

### FIXED CHARGES.

The fixed charge includes the income which the money invested in the car and its appurtenances would bring if it were invested in such a manner as to bear interest; the decrease in value of the car, or depreciation, which is mainly a matter of elapsed time alone, but which is somewhat dependent upon the extent and manner of use of the car; the cost of storage; the expense of fire and liability insurance upon it; the wages of a chauffeur if one is regularly kept; and taxes and license fees.

The operative charge includes the cost of fuel and oil and of ignition current, lights and tires. It also includes the cost of washing and polishing, and of tires, repair parts and labor expended in making adjustments and repairs.

Not all prospective owners of cars take the trouble to figure the inevitable expense in fixed charges which they are incurring in buying their cars, nor do they consider how much the fixed charge per annum is affected by the selections which they make, The bearing of the fixed charge upon the per mile of service required is too seldom regarded. As an example, two touring cars, one costing \$4,500 and the other \$1,500, fully equipped, may be taken. There is a fairly general agreement that 20 per cent. per annum represents the average rate of depreciation of a motor car, so far as its selling value is concerned, but there are those who believe that low priced cars depreciate more rapidly than those of high price, so 20 per cent, will be assumed in the case of the former and 25 per cent. in that of the latter. Interest on the investment will be taken on a 6 per cent, rate,

In the following two columns are enumerated several items which go to make up the fixed charge, the first column referring to the high priced and the second to the low priced vehicle:

	(1.)	(2.)
Interest on the investment	\$270.00	\$90.00
Depreciation	900.00	375.00
Storage	120.00	120,00
Fire insurance	112.50	45.00
Liability insurance	70.00	43.00

Totals .....\$1,472.50 If taxes are paid they are likely to be in proportion to the costs of the vehicles upon which they are assessed. As the high priced car may be assumed to be more powerful than the low priced one, the rate of registration will, in many States, be somewhat larger upon the former than upon the latter vehicle. The salary of a chauffeur is also more likely to constitute an additional item in the fixed charge upon the "swell" and powerful high priced car than upon the lower priced vehicle.

In the case of No. 1 (the high cost car) the fixed charge amounts to \$4.03 per day, and for No. 2 (the low priced vehicle) \$1.84 per day. This charge is inevitable, whether the car is used or not. If the rate of depreciation of the low priced vehicle were to be taken at the same rate as that of the high priced car its fixed charge cost per day would become \$1.64 instead of \$1.84. The figure \$1.84 will, however, be retained

#### FIXED CHARGE PER MILE.

It is at least interesting to note that, assuming gasoline to cost 15 cents per gallon, and that car No. 1 gives a mileage of 11 miles per gallon, while car No. 2 travels 15 miles per gallon, the daily fixed charge is equivalent to the fuel cost for 295 miles of driving, in the case of car No. 1, and for 184 miles of driving in the case of car No. 2.

As the fixed annual charge imposed upon the owner of a car is independent of the amount of service which the car performs, the greater the mileage traveled by the vehicle the lower will be the per mile fixed charge. Very few cars are used less than 2,000 miles per year, and not a large proportion more than 10,000 miles per annum, and these two figures serve well as extreme examples.

Car No. 1 if used 2,000 miles per year will show a per mile fixed charge of 73.6 cents, and if used 10,000 miles, of 14.7 cents.

In the case of car No. 2 the per mile fixed charges are, respectively, 33.6 cents and 6.7 cents.

The above figures admirably demonstrate a perfectly obvious though little heeded fact, that if a motor pleasure vehicle is to be operated with any sort of economy from the standpoint of service rendered it must be very largely used. It is hardly too much to say, with only slight exaggeration, that it should be kept going all the time.

As a piece of expensive machinery the automobile has few counterparts as regards the small proportion of its life during which it is actually rendering the service for which it is constructed. A pleasure vehicle which covers 10,000 miles is actually running during only about 666 hours of the 8,760 hours in the year, or about 71/2 per cent. of the time. The great majority of all other pieces of machinery of the same grade are in actual operation at least 2,700 hours per annum, or 30 per cent. of the time. The average pleasure car making 5,000 miles per annum is thus in active use only about one-eighth as much of the time as the generality of high grade machinery. It is not strange, therefore, that the fixed charge per unit of service rendered is enormously large. The pleasure car is too much like a machine which is "shut down" seveneighths of the time.

ANNUAL MILEAGE A FACTOR IN CAR SELECTION.

There is one point that can here be made which should appeal to the prospective buyer who is inclined to view the matter from the economic standpoint, namely, unless the buyer's requirements include a large annual mileage it will prove a very expensive matter for him to purchase a high cost vehicle. If only a small annual mileage is to be covered the fixed charge per mile will inevitably form a large part of the

sle charge per mile, and if a high priced

car is purchased the fixed charge per mile will not only form an excessively large part of the total but will be exorbitantly large. If a person motors but a couple of thousand miles a year, as many do, he is paying high for his pleasure if he buys a high priced car for this very limited service. As previously stated, 73.6 cents and 33.6 cents represent the fixed charges per mile on a 2,000 mile per annum basis, for the high and low priced vehicles here assumed.

If, on the other hand, a person requires extremely extensive service of a car, he can much better afford to buy an expensive vehicle, for his fixed charge per mile becomes a very much less important part of the total per mile expense, and the increase in its absolute magnitude becomes far less important, so much so, perhaps, as to be more than counterbalanced by the satisfaction to be derived from owning a swell car with large reserve of power and luxurious qualities.

#### HIGH PRICED CARS FOR HARD USERS.

Now that the automobile art has so far advanced that there may be applied to it a paraphrase of the Kentucky gentleman's opinion regarding whisky, that "all cars are good but some are better than others," the expectant buyer looking for a car is more likely than ever before to make price the basis of comparison and a leading consideration in his decision.

It is no longer necessary to question whether a car will give service, but to seek the relationship between service and outlay. Another requirement in addition to the extent to which the car is to be used ought to be clearly in the mind of every economical buyer, before he makes his selection, namely: Whether he is going to demand high sustained speed over all kinds of roads, or whether, on the contrary, he is going to use his car at low speeds and to drive considerately over all rough places. If a man expects to "jam" his car, at speed, over all kinds of road conditions, the economical car for him is altogether another proposition than that adapted to the owner who is not only a moderate driver but a careful one.

The writer believes that the chief difference in the practical performance of the high priced and the low priced car lies in the ability of the former to serve at high speeds under arduous conditions, for long periods of time, with less breakage, less rapid depreciation, less need of adjustment and more comfort to its passengers than will the low priced car.

It is a salient fact, brought out year after year by the Glidden Tours, that very few cars, of whatever grade, are capable of being run at the maximum speeds at which their motors are well able to drive them without suffering breakages of their running gears or transmission parts. That is, the engines are more enduring than the rest of the cars they propel. But it is also a demonstrated fact that the high priced cars, on the average, approach more

nearly, as vehicles, to an endurance comparable with that of their motors than do low priced cars in general.

The lesson to be drawn from these facts seems quite obvious: If a car is required to be pushed to its limit of performance the major part of the time, a high grade vehicle will be most likely to give satisfaction. On the other hand, there is reason to believe that a low priced car, run, on the average, at only a fraction of its available speed and given some consideration at all the rough places, may give nearly if not quite as long and satisfactory service as the high priced vehicle used strenuously. It is safe to say that a good, low priced car will last as long, under conditions of easy driving, as the average owner will care to use the same car.

The above considerations are of course entirely apart from those relating to the differences of style, appointments and the quality of the finish found in the two classes of cars, but it should be remarked that the slow and careful driver has less need of the high priced car than the hard driver, because he requires less power, and the high priced car is in general the high powered car. Furthermore, as the slow speed driver operates his engine closely throttled most of the time, he will secure better fuel economy from the small engine, which is generally found on the low priced car, than from the large engine generally installed in a high priced vehicle.

A WORD OF ADVICE.

One closing suggestion to the prospective buyer. Do not try to get too large and too powerful a car for too little money. A small sum will buy a good low powered car, and a large sum of money will buy a fine high powered car of large capacity, but a small outlay will not yet suffice for the purchase of a big car which will be a profitable investment. There may be exceptions, but this statement is substantially true. This "don't" applies to all prospective buyers, but especially to the one who is a hard driver. The easy driver may get along with the cheap, big car, and be able to swing considerable style with only moderate current repairs, but the fast and careless driver will almost infallibly come to grief, for the big bore motor of the cheap car will be likely to pound the car as a whole to pieces, in a period of time much less than the normal life of an automobile.

According to a report from Milan, Italy, the Government has recently opened an automobile line from Courmayeur to the hospital on the Little St. Bernard, at an altitude of about 9,000 feet above the sea level.

Another attempt to reorganize the cab service of Vienna on a motor basis is to be made this fall, when 300 taxicabs are to be placed in service. A number of cabs for the training of drivers have already arrived. The date on which the service is to begin has not yet been announced.

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# "Twenties" a Prominent 1910 Feature,

Recent years have witnessed a decided reduction in the size of motors of the four cylinder type in general use, the employment of cylinder bores of over 434 inches having become rather uncommon. Bores ranging from 4 to 41/2 inches have come to be much more generally employed than hitherto. The development of the six cylinder motor and its employment for high horse power is partly responsible for this, but the lack of sweet running qualities and the inability to operate for long periods without mechanical attention has been an important cause leading to loss of popularity upon the part of the very large bore four cylinder engine. Moreover, a certain portion of the public has come to a realizing sense that great power is not only not a necessity but is economically undesirable.

The season of 1909 has witnessed the sale of a very large number of cars known as "thirties," equipped with motors of about 4 inch bore, as well as a large number of cars with 4½ inch bore motors and a considerable representation of vehicles with 4½ inch bore engines. The 4 inch bore engine, numerically speaking, has been ex-

ceedingly prominent, and the "thirty" has been rather a feature of this season, as cars of this rating have generally been sold at popular prices.

That the extensive use of four cylinder motors of less than 4 inch bore is to be looked for is indicated by the recent appearance of several models of runabouts, roadsters and small four passenger touring cars, equipped with motors rated at 20 horse power or thereabouts, and of about 3¾ inch bore.

The four cylinder motor of about this bore has been prominent abroad for some time past, and it is reported to have proved itself very economical in operation. There is no doubt that, if well built, a four cylinder engine of this size is very quiet running and durable, and that it is ample in point of power for runabout and light four passenger service. Considering the reasonable prices at which cars of this kind bid fair to be sold, and the reasonable expense at which it should be possible to operate them, it may be expected that their advent may accomplish much in the direction of extending the use of the motor car in quarters where it has been little employed hitherto. It may be that the "twenty" will prove as much of a factor in the market within a short time as the "thirty" has during the present season.

Experience has shown that the automobile buying public demands a motor of at least four cylinders, even for very moderate horse powers, and it seems likely that the motor of about 3¾ inch bore, with its "hummingbird-like" performance and moderate fuel consumption, will appeal to a very large body of buyers of moderate tastes

# Preventives Against Steering Gear Accidents.

Accidents brought about by breakage or disconnection of the steering gear are relatively rare, but when they do occur they are generally of a very serious nature. An instance in point occurred in New Jersey last week when two persons were killed and several more injured as the result of accidental disconnection of the steering rod. It would seem that, especially in connection with fast cars or in mountainous districts, the fatal possibilities involved in failure of the steering mechanism really call for the provision of an emergency steering gear that can be used when the regular gear fails. Emergency brakes are fitted to practically all cars, yet under most circumstances a failure of the brakes is less fraught with danger to the occupants than failure of the steering ear. Of course, brakes become ineffective through wear of their frictional surfaces more frequently than steering gears, but this difference may be regarded as compensated for by the greater seriousness of steering gear failure.

Conscientious construction—that is, the use of the best materials, liberal dimensions of parts and the provision of reliable locking means to all joints—will do a great deal toward eliminating the risks; but the fact remains that the safety of the occupants depends upon the integrity of a single linkage of quite a number of parts, and either the breakage or disconnection of this linkage while the car is being driven at 30 miles per hour or more means almost certain death.

In all other cases where human life depends upon the failure of mechanism, as in elevators, for instance, suitable safety appliances are provided, and it would seem that something of this sort should be fitted to all high powered cars at least. The provision of an emergency steering gear would seem to be the most practical plan. As in the case of brakes, the two gears should be absolutely independent, so that no defect of one could possibly interfere with the other.

The provision of double tie rods, in front and back of the front axle, respectively, was advocated in these columns some years ago, and we believe that the idea has been applied in practice to a limited extent. An emergency steering gear would, besides, include an extra steering wheel and post, an extra reducing gear and an extra steering rod. The reducing gear would have to be of the reversible type (bevel or spur gear), as it would under normal conditions be operated backward by the driver. The emergency steering wheel could probably be located directly underneath the main steering wheel, concentric with it. Ordinarily it would be impossible to steer the car by the emergency steering gear, owing to the locking effect of the irreversible main steering gear. But if the main steering rod should break or come loose at either end, which would render the main steering gear ineffective, the car could be steered by the emergency gear.

There is naturally a good deal of disinclination to load down a car with extra mechanism that may possibly not once be used during its entire life, and the more inviting path to improvement is along the

line of rendering the joints in the steering linkage more secure. But it seems to be impossible to devise a mechanism that is absolutely infallible, especially when subjected to the abuse and neglect that are often the lot of an automobile, and it would certainly be a great comfort to many drivers to know that there is an emergency steering gear to fall back upon if the main gear fails for any reason.

### Distinctive Catalogues.

Every now and then some user of catalogues, who has been trying to reduce his collection to a semblance of order, breaks into print with a story of his troubles and forcible suggestions as to the advisability of standard sizes. Whether the people who issue catalogues ever read these tales of woe or not is a question; at least, the day of standard sizes seems to be as far off now as it was ten years ago. It would seem that the general idea is to have catalogues express individuality by their odd shapes rather than by any other peculiarity.

But while the advantages of standard sizes are manifold and cannot be too often emphasized, there are other points in the makeup of a catalogue which deserve more attention than they appear to receive. We refer particularly to catalogues of parts or accessories which are issued yearly and are sent out to the same buyers season after season. As was recently remarked in these columns, these catalogues merely serve to sell goods by, and no attempt should be made to have them resemble works of art.

The more clearly the goods are illustrated and described, the fewer the words in which the necessary facts regarding them are told, and the easier it is to find the article wanted the better does the catalogue serve its purpose. There remains the question of making the catalogue itself easy for the user to find, so that he shall give it preference over those of other makers when he is in a hurry to find something in this particular line. This can be done by making the catalogue distinctive in color and cover design.

If, when issuing the first catalogue for a line of goods likely to be manufactured for several seasons at least, some distinctive color scheme was thought out for its cover and adhered to as long as the goods were catalogued, this cover would gain in advertising value with every issue, for more and more people would recognize it. Quite a few companies have done this, but the maity have not, which makes the practice

all the more advantageous for those who have.

In most methods of filing catalogues they are placed so that they must be recognized by their backs, and unless some distinctive title is printed thereon, a recollection of the shape, size and color of the catalogue is all the searcher has to go by. When we consider this it seems strange that so few catalogues, even when thick enough, have anything printed on the back. The identifying title should always be there, and as a usual thing it should consist of something more than the firm name, for although the company may make only one kind of goods the searcher may not be familiar with the fact. So the title should, as a rule, include both the articles catalogued and the name of the manufacturer; in full if there is sufficient room for good sized type, or in some abbreviated form if not, but not so condensed as to fail of being perfectly plain to the average user. Both front and back covers should, of course, bear similar titles, together with the trademark, or some distinctive device.

We believe that if these few suggestions are followed the average catalogue will be much more valuable to its publisher, because it will be more serviceable to its user. A considerable experience in the use of catalogues has shown us that when they are needed most they are generally wanted in a hurry, so that the catalogue which can be found most readily and in which the article sought for is most conveniently displayed will be oftenest used.

While a distinctive and handy catalogue cannot take the place of good quality of material, workmanship and design in the goods catalogued, it may, we believe, go a long way toward making these necessary attributes of a good article more generally appreciated.

# Popularization of Electric Vehicle Lighting.

The employment of electric lights upon gasoline automobiles, which, up to within a very short time, has been so exceptional as to be hardly worthy of consideration as a practice of commercial importance, has extended in a remarkable manner within the last six months or so. Electric side and tail lamps are now no longer a rarity, and electric headlights are quite common. Indeed there are indications that electricity may soon become the accepted illuminant for motor cars, to the widespread if not general displacement of gas and oil.

The public, accustomed as it is to seeing electricity displace other illuminants in stationary lighting, seems very ready to welcome electricity in motor car lighting, and it is significant that several manufacturers of high grade cars are advertising electric side and tail lamp equipments as features of their 1910 models. This popularization of electric vehicle lamps is exerting a decided effect upon certain lines of electrical accessories used in the automobile industry.

The storage battery, the popularity of which in the ignition field has lately been seriously menaced by the general adoption of the high tension magneto, is finding a new and extensive field of application in the operation of high efficiency tungsten lamps.

The small direct current dynamo, driven from the engine, which never attained any very extensive application while the furnishing of the small amount of energy required in ignition was its only field of usefulness, has been brought into considerable prominence now that there has arisen a demand for considerable quantities of electrical energy to be used in lighting.

These small dynamos, arranged to be used in connection with storage batteries, have, in consequence, been rapidly improved of late, especially as to the automatic means provided for regulating the voltage, irrespective of engine speed, and as to the manner in which they are driven from the vehicle engine.

Even the magneto, of types other than the synchronous, has been affected by the demand for lighting energy, and these machines are now being constructed with a capacity in excess of that required for ignition purposes, which additional output may be used for lighting.

It would be strange indeed if the adoption of electric lighting should have its effect upon ignition practice, but it is not inconceivable that it may. It is not impossible that the general use of electric lights, with the large electrical generating and storage capacity which is involved, may adversely influence the popularity of the high tension magneto. The presence of a large storage battery capacity and a charging source installed upon a car for lighting service, from which abundant ignition curtent can unfailingly be drawn, may make the installation of a special synchronous magneto, for sparking only, appear superfluous.

Automatic car speed governor contests are now being held in Austria and Switzerland.

# Fuel Economy and Its Dependence on Engine Design.

The recent increase in the wholesale price of gasoline has still further added to the importance of so designing engines that they will operate with the least consumption of fuel. Economy in fuel consumption depends undoubtedly to a greater extent upon the carburetor than upon the engine, yet it is well known that quite a few points in engine design have a strong influence upon the amount of fuel used per brake horse power hour. The subject was forcibly brought to the attention of designers some years ago by a number of European contests in which the amount of fuel allowed the competing cars was limited; it also was brought home especially to American engineers through the fuel economy contests held in this country in recent years, though, owing to the fact that these latter contests were always announced only a short time in advance, and none of them partook of the nature of a national event, they naturally did not have any great effect upon design. These contests clearly showed, however, that air cooled motors are more economical of fuel than water cooled motors. This is, of course, due to the fact that the cylinder walls of air cooled motors are kept at a considerably higher average temperature than the cylinder walls of water cooled motors. It has been pretty definitely established that the horse power output of an engine decreases as the wall temperature increases above the minimum temperatures found in actual practice, but the fuel efficiency varies inversely as the output, and increases with the cylinder tem-

The various means available for increasing the fuel economy of engines may be summarized as follows: Maintenance of the cylinder walls at the highest possible temperature that will not interfere with proper lubrication; compression spaces of the least wall surface in proportion to cubical contents; dilution of the charge by an excess of air; increased expansion of the gases, and the use of long stroke motors.

### HIGH CYLINDER TEMPERATURE.

According to some experiments made in this country, the most efficient cylinder wall temperature is about 350°. The cylinder walls can only be maintained at this temperature if the air cooling system is adopted. The ordinary systems of water cooling do not permit of a higher temperature than 212° for the outer surface of the cylinder walls. Water cooling would admit of higher wall temperatures if the water system was closed and a certain steam pressure was maintained in it, but this involves so many objectionable features that it is not likely to be adopted. Where water cooling is adopted the aim then should be to keep the water in the jackets at as near the boiling point as possible. This is undoubtedly best accomplished with the thermo-siphon system of circulation, with which system the speed of circulation varies automatically in proportion to the temperature of the cylinder walls, so that the tendency is to keep this temperature uniform. The thermo-siphon system requires a somewhat larger radiator capacity, and is therefore not so well adapted to very powerful cars, which is probably the reason why it is not more extensively used at the present time. Aside from the advantage of automatic regulation of the circulation in accordance with the needs, the system has the advantage of simplicity, as compared with the pump circulating system.

The second method of increasing the fuel economy consists in using a compression space of such conformation that the wall surface is a minimum for the particular cubic volume required. It is at once obvious that all valve pockets and passages must be avoided, and that the valves must open directly in the cylinder. In the majority of motors in which the valves are thus located the cylinders have flat heads. as this permits of placing the valves with their stems vertical, thus simplifying the arrangement of the valve mechanism. The combustion chamber then has the form of a flat cylinder. It can easily be shown, however, that the same compression space can be obtained with less wall surface if the cylinder heads are doomed, and the compression space is made substantially hemispherical. This form of compression space has been used in this country for many years in the motors of the Welch cars, and it is also used in the Franklin motors, in which latter its use is facilitated by the concentric valves in the centre of the head. Where two valves have to be placed side by side in the head, the centre of the hemisphere is often flattened so as to permit of placing both of the valves vertically. In the Welch motors, however, the valves are placed at an angle of about 45 degrees each.

### DOMED CYLINDER HEADS.

A reduction in the surface area of the compression chamber is of the greatest importance, because the gases at the time of their inflammation attain a very high temperature, and a great deal of heat is lost through the compression chamber wall directly after ignition. From 30 to 40 per cent. of the total heat liberated by the combustion of the charge is lost through the walls. The loss of heat, of course, continues from the time the gases are ignited until the bulk of the spent gases has escaped through the exhaust valve, but the loss of heat is far more rapid during the first portion of the power stroke, when practically only the compression chamber wall is exposed to the action of the hot gases, than during the last portion of the stroke, when both the compression chamber wall and the cylinder wall are exposed to the heat of

the gases. The loss of heat through the walls is directly proportional to the area of the walls, and also directly proportional to the difference in temperature between the inner and outer surfaces of the walls. The temperature on the outside of the walls does not vary materially, but the temperature on the inside decreases very rapidly as the piston proceeds on its outward stroke and the charge expands, and an engine indicator diagram may be taken to roughly represent the variation of temperature inside the cylinder during the power stroke. This consideration shows that it is of the greatest importance to keep the wall surface down as low as possible during the first portion of the power stroke when the difference between the temperatures on the inner and outer surfaces of the compression chamber wall is very high.

#### LONG STROKES.

The above reasoning also shows why a long stroke motor is more economical of fuel than a short stroke motor. In order to generate a certain number of horse power it may be assumed that a certain piston displacement or cylinder volume is required. In order to obtain this cylinder volume we may either use a large bore and a short stroke, or a small bore and a long stroke. A little calculation will show that if a cylinder of given cubic contents is to have the least surface area, the diameter and length must be made equal. However, since the temperature in the cylinder during the latter portion of the power stroke is comparatively low, the amount of surface exposed to the action of the gases during this portion of the stroke is of little consequence. An inspection of an indicator diagram will show that the pressure and temperature inside the cylinder have fallen to a small fraction of the original values after one-eighth of the stroke has been completed, if the charge is properly dosed and ignition occurs at the proper moment. But even if all the conditions are not exactly right, the temperature has dropped to a low value after one-quarter the stroke has been completed, and the rest of the stroke may therefore be neglected in a consideration of the best proportion of bore to stroke.

Let us assume that we have a motor of equal bore and stroke, and that the compression space is cylindrical and of one-third the volume of the piston displacement—proportions which are commonly met with in actual practice. Then, at the beginning of the power stroke, the burning gases are contained in a flat cylindrical chamber of one-third the height as the diameter. It was shown above that the height and diameter of the cylinder should be equal in order to make the surface a minimum, and it will be seen that in our case the cylinder is

much too flat to meet this condition. Even at the completion of one-quarter of the stroke, when the temperature of the gases has dropped to a low value, the height of the cylinder containing the gases is still only seven-twelfths of the diameter.

Now, let us assume that we have a motor whose length of stroke is twice the bore. If the volume of the compression space is again equal to one-third the volume of the piston displacement, then the gases at the beginning of the power stroke are contained in a cylindrical chamber whose height is equal to two-thirds the diameter, and at the completion of one-quarter of the stroke of the piston the gases are contained in a cylinder whose height is seven-sixths the diameter of the bore. In this case the theoretical requirements are therefore practically met.

### INCREASED EXPANSION.

Another expedient for increasing the fuel economy of motors consists in increasing the expansion of the gases. The timing of valves has changed somewhat in recent years, and in consequence the gases are now expanded less, in most cases, than they formerly were. This is due to the early exhaust opening now found on most motors, the exhaust valves generally opening with about 45 degrees lead. It is also customary to close the exhaust valves only about 10 degrees after dead centre, and to open the inlet valves after the crank has passed through another 5 degrees. The inlet valves are closed from 15 to 20 degrees after dead centre so as to give the cylinder a chance to fill up at high piston speeds by reason of the kinetic energy of the gases. The useful expansion of the burning charge really ceases the moment the exhaust valve begins to open. If the valve is set to open with 45 degrees lead, this decreases the effective length of the expansion stroke about 12 per cent. The expansion can readily be increased by holding open the inlet valve until a portion of the compression stroke has been completed. The returning piston then forces some of the charge that has just been drawn into the cylinder, out again. In a four cylinder engine the charge thus forced out will enter the cylinder next in order in the cycle of operations, as each inlet valve is held open for more than a half revolution of the crank, and the periods of inlet valve opening therefore overlap. In this way, therefore, no charge is lost.

The inlet valve may be held open until the piston has completed one-quarter of the compression stroke, for instance, in which case only three-quarters of the normal full charge is retained in the cylinder and utilized. It is, of course, obvious that with this reduced charge the motor cannot develop quite as much power as with a full charge, but in addition to the advantage of increased expansion of the gases, whereby a greater proportion of the heat units liberated is practically utilized, there is the further advantage that the gases at the time of discharge from the cylinder are at lower pressure and temperature, and the problem of muffling the exhaust is consequently rendered easier. With the same compression pressure the average temperature in the cylinder is reduced by this arrangement, and it is therefore possible to slightly increase the compression pressure without encountering the danger of preignition.

#### DILUTION OF CHARGE.

Almost the same effect as obtained from increased expansion may be secured by diluting the charge with an excess of air. This subject has been thoroughly investigated in connection with the stationary gas engines. Where ordinary coal gas is used the theoretically perfect mixture contains about one volume of gas to six volumes of air. It has been found, however, in practice that when this proportion is used the charge burns with such rapidity that it is difficult to avoid preignition if a compression pressure of 70 to 75 pounds per square inch is exceeded. This difficulty may be overcome by diluting the charge with an excess of air, and compression pressures of as high as 140 to 150 pounds per square inch have been found practicable when the gas is mixed with air in the proportion of 1: 10 to 12. Operating with such dilute mixtures led to very important gains in respect to fuel economy. With the theoretically correct mixture and low compression pressure, the fuel consumption was about 28 cubic feet per horse power hour, while with the diluted mixture and a compression of about 140 pounds per square inch it was reduced to about 17 cubic feet per horse power hour. Seventeen cubic feet of coal gas contains approximately 2,100 calories. Automobile motors, on the average, consume 0.15 gallon of gasoline per horse power hour, containing 4,400 calories, which shows that there is still much chance for improvement in respect to increased fuel economy.

In one sense the dilution of the charge with an excess of air is simply another way of increasing the ratio of expansion of the gases. The excess air does not take part in the chemical action of the combustion, but it absorbs some of the heat developed during the combustion, which would otherwise be transferred to the cylinder walls. During the latter portion of the stroke it gives out some of this heat again. The presence of the excess air keeps down the temperature within the cylinders and retards the combustion, but it does not detrimentally influence the inflammability of the charge, as do burnt gases when present in too large a proportion.

The use of increased expansion in gasoline motors was recommended in an article by Harry E. Dey, which appeared in The Horseless Age a number of years ago. Mr. Dey recommended the use of automatic inlet valves with strong springs,

which would close the valve before the cylinder volume was completely filled. While this arrangement would serve the purpose, the method above described by closing the inlet valve only after the piston has completed a considerable portion of the compression stroke, would seem preferable because the amount of charge drawn in would be more accurately gauged, and would not depend upon such a variable factor as the tension of a valve spring.

It is quite possible to combine the two last described methods of increasing the fuel economy. viz., increase of expansion and charge dilution, and it is claimed that both were used by Bablot when he established the fuel economy record on a Berliet car in 1906, which created such a stir at the time. Bablot covered a distance of 100 kilometers at an average speed of 73 kilometres per hour on a fuel consumption of less than 9 litres of gasoline, and that with a four cylinder motor of 100 millimetres bore and 120 millimetres stroke, and a vehicle weighing in running order practically 1.400 kilograms.

The effect of these practices upon the cool running of motors was clearly evident during the Grand Prix race of the Automobile Club of France in 1907. The rules of this race stipulated that the competing vehicles must use not more than 30 litres of gasoline per 100 kilometres, and the various designers naturally employed every means known to them for keeping down the fuel consumption. In this race competed a number of vehicles with motors of 180 millimetres bore and 170 millimetres stroke (7.2x6.8 inches), which ran from the beginning to the end of the race without showing the least sign of overheating, in spite of the enormous cylinder dimensions. The following year the limitation on fuel consumption was removed, and instead the cylinder bore was limited to 155 millimetres. Fuel consumption did not count this time. and in order to make up for the reduction in the size of the cylinders, the manufacturers naturally used a charge which gave the most powerful explosion-in other words, a rich charge. The result was that the cars of some of the best known French makers were thrown out of the race by overheating of their engines.

# Grand Central Show Blanks Out.

Application blanks and space diagrams of the Tenth International Automobile Show. which opens in the Grand Central Palace. New York, on New Year's Eve, were sent out last week. All applications for space received up to Friday, October 1, 1909, will have equal consideration in the first allotment on Friday, October 8. The allotment of space to the members of the Motor and Accessory Manufacturers will be made by that association, as is the case with the members of the Importers' Automobile Salon. Members of the A. M. C. M. A. will have the first drawing of vehicle space other than that allotted to the members of the Importers' Automobile Salon.

# British Trials of Headlights.

The Local Government Board recently requested the Automobile Club of Great Britain and Ireland to investigate and report upon headlights used upon automobiles, and the club in consequence instructed its technical committee to make the necessary tests and prepare a report. The club had previously discovered that among the causes making automobiles unpopular with the general public was the use of dazzling headlights on cars while driven in populated centres, whereby other road users are blinded. The club held the opinion that this effect could be minimized and still enough illuminating effect obtained for all ordinary purposes, by properly controlling the cone of light. Some manufacturers had already given attention to this problem, and some lamps had been produced specially with this object in view. It was hoped that the test would bring out the points that should be considered in building a successful lamp of this type, and this, the club avers, has been accomplished.

### JUDGES' REPORT.

The principal lamp makers responded to the invitation extended to them to submit their productions for the tests, which were of a searching nature, and were so arranged as to demonstrate the optical properties of the lamps. Thanks to this co-operation, a thorough investigation was possible, and the tests proved that the dazzling effect of headlights could be minimized while at the same time sufficient light could be provided

The entry list was fully up to expectations. The firms engaged numbered twentyone, and the number of entries was fortyseven. Of these thirty-three were acetylene, twelve electric, one petroleum, and one gasoline oxygen.

The entrant was invited to set his lamp to the best advantage in every respect, both the height and the angle of elevation being left to his discretion, and note was made of the height of each lamp above the ground (Table II, colmun f).\*

The records referred to in the following paragraphs were taken in respect of each lamp, and Table II shows in summarized form the certificates of performance issued in each case to the entrant. The diagrams and the sketches and illustrations also appear upon the certificates.

The Range.—The distance at which the lamp gave a certain standard of illumination (one-tenth of a candle-foot) was measured down a line along which the entrant had centred the beam of the lamp.

The Horizontal Dispersion of Beam.—The width of the beam over which the illumination of the head lamp was not less than the standard was measured at half the above range, firstly, at 3 feet above the ground, and secondly, at the eye level, assumed for the purpose of this test to be 4 feet 6 inches from the ground. The width of the beam at 3 feet above the ground was taken, because a maximum of illumination obtained at this level is useful to the driver and does not cause trouble from glare.

The standard of light upon which the photometric measurements were based was the same for all the lamps, viz., one-tenth of a candle-foot; that is, the illumination received upon a surface I foot from a source of light measuring one-tenth of a candle power.

The judges adopted this standard as giving a range at which details could be distinguished, but it should be remembered that the useful range of the lamps, i. e., that at which objects can be seen, is often substantially greater than that given in column g of Table II. The full effective range depends upon the nature of the object, e. g., its size and color contrast.

The Dazzling Effect.—The distance in front of the lamp at which an observer

<sup>\*</sup> See end of report.

Table I.—Table Showing F	RELATION OF CAN Nominal	DLE POWER TO	PRESSURE	AND CONSUMPTI	ON OF GAS.
Burner.	Consumption, Cu. Ft. Per Hour.	Pressure, Inches of Water.	Candle Power.	Consumption, Cu. Ft. Per Hour.	Candle Power Hours Per Cu. Ft.
i	35	6	13	.70	18.5
		4	11	.55	20
		3	10	•45	22.2
		2	7	•33	21.2
ii	5	7.8		.70	11.4
		6	11	.65	16.9
		4	8	.48	16. <b>6</b>
		3	8	.41	19.5
iii	5	6	13	. 78	16.6
		4	11	-57	19.3
		3	11	.48	22.0
iv	62	6	17	.87	19.5
		4	16	. 67	23.9
		3	17	.60	28.3
		2	13.5	-47	28.8
		1	6	. 29	20.7
<b>v</b>	62	6	20	.88	22.7
		4	18	.68	26.4
		3	17	. 60	28.3
ví	88	6	52	1.48	35.1
		4	44	1.24	35.5
_		3	36	.95	37.9

could distinguish an object placed 6 feet to the side of, and 6 feet beyond, the lamp was measured. The object chosen was such that it could be discerned on a starlit, moonless, clear night at a distance of 100 feet in the absence of any headlight.

Back Reflection.—The term back reflection is used to denote the stray light thrown out rearwardly. Such stray light interferes seriously with the vision of the driver, and thereby operates to diminish the effectiveness of the lamp.

Prior to the tests the naked candle power of the burners and bulbs was officially measured. These results and the corresponding consumption figures are shown in columns a and b of Table II.

For the sake of facilitating reference the acetylene and electric lamps have been arranged according to their candle power, and the details of one lamp, the gasoline-oxygen, which is a type of limelight, have been set out separately.

Design and General Construction.—The lamps remained in the possession of the club after the tests, in order that the design and general construction might be investigated; at the same time sketches were made of the optical arrangements of the lamps, and are shown in Appendix I.

Under the heading of simplicity of design and general construction, the judges attach importance to the following points: Weight for size; ease of cleaning; absence of liability to rattle; fewness of parts; quality of hinges, clasps, supporting sockets, etc., and general method of assembling the lamp. Many of the lamps examined showed that entrants had paid considerable attention to these points.

The measurement of the candle powers of the sources of light has brought out the fact that the generally accepted idea of the intense candle power of headlights is erroneous. The naked light of a head lamp such as is usually employed is from 15 to 25 candle power, and this light is collected and directed by lenses and mirrors. Thus Table II, column a, shows only two acetylene burners exceeded 30 candle power, while in the case of electric lamps the number was the same.

In the opinion of the judges, so long as the optical arrangements of the lamps are efficient, ample illumination is afforded by about 20 candle power, which can be obtained in the case of an acetylene lamp with a consumption of about .7 cubic foot of gas per hour (about 2.8 oz. of calcium carbide), and in the case of an electric lamp with a consumption of about 21 watts.

It is to be noted that the larger the mirror and the smaller the source of light, the easier it is to avoid undesired dispersion of the beam. Accordingly, when considering the advantage of a light weight lamp, the importance of the size of the mirror must not be overlooked. The weight of all lamps is given in Table II, column e. The lamps marked †† are self-contained, and were weighed with the generator empty.

For the purpose of the tests the relation

of both pressure and consumption of gas to candle power was investigated. Some examples of these tests are shown in Table I.

From these experiments it will be observed that the candle power of an acetylene burner varies but little between pressures of 3 inches and 6 inches of water, but the consumption rises to an important degree. In the opinion of the judges, lamps and burners as now constructed require no pressure higher than 4 inches, and the most economical pressure is 3 inches of water. Increasing the size of the burner has small effect upon the range, unless the optical system is altered proportionately. Increasing the size of the burner tends to increase the width of beam, and in some cases the glare.

The effect of variations of voltage on electric lamps depends upon the substance of which the filament is made. The increase of light resulting from an increase of voltage in the case of metallic and carbon filaments is shown in the following table. For example, a 5 per cent. increase of voltage gives approximately a 31 per cent.

increase of light in the case of a carbon filament lamp, and 23 per cent. in the case of one with a metallic filament.

TABLE III .- VARIATION OF CANDLE POWER COM-PARED TO VARIATION OF VOLTAGE.

	tage of to That		Percentage of Candle Power to —That of Normal Voltage.—							
of Normal.		Carbon.	Tantalum.	Tungsten.						
85		. 41	50	55						
90		. 56	64	67						
95		. 75	80.5	82						
100	(normal)	. 100	100	100						
105		. 131	123	119						
110		. т68	148	141						
In	certain cas	ses the	electric la	mps were						

# TABLE II.—SUMMARY OF RESULTS OBTAINED.

		a		b	c	d		Î	1	E	1	hı	h	2	k	1	m
io. Name of Entrant.	Candle-power of naked light.	tic	oump-	ire.*	ster of front aper-		100	ground.		E	alf r	m at	e	istance from lamp at bich dazzle ceased, at ft. 6 in. from ground.	Remarks on design and construction.	Remarks on back reflection (stray light thrown out rearwardly).	
		Cand	Cubic feet hour,	Watts	Pressure	Diameter of	Weight		Height	Range,	A .		At 4 ft		Distar which	Rema	· · · · · · · · · · · · · · · · · · ·
1 Var 2 Bac	ndervell & Codger Brass Mfg. Co	3.9 4.2		4	volts 8.2	in. 4¾ 4½ 4½	1b. oz	1 3 7 2	in. 01/2 7	ft. 43½ 51	ft. 8	in. 6 7	ft. 8 7	in. 6 2	ft. 22 26	Good Very good	No stray light, Light issued round rim of front; also reflections from the body of the lamp.
\$5 A. I	ncott & Son ndervell & Co Dunhill, Ltd. (without screen) Smith & Son, Ltd.	4.8 5.0 7.9 7.9 11.3	.45 .45 .46	3.9 -	4,9 	616 434 636 636 736		5 2	1 10 10	30 78 69 93 81	7 7 9 5	5	6 7 5 9 5	10 3 11 9 0	15 29 35 30 37	Fair Fair Good Good Good	No stray light. No stray light. No stray light. No stray light. Light was visible through a row of holes partially hidden by the top of
7 Rus ‡8 S. S	shmore Lamps, Ltd Smith & Son, Ltd	12.5 13.5	.63 .64	Ξ	Ξ	6% 6%	7 1 ††12 1	5 2	3½ 10	87 6434	11 8	8 5	10	8	31 41	Very good Good	Light was visible through a row of holes partially hidden by the top of
9 Rot	ax Motor Access, Co	13.8	.69	-	-	65%	††11	0 2	61/2	6734	10	11	13	1	21	Good	Light issued from two ventilating holes in the cowl and from the rim of from
10 Do.	H. Gentry(½ voltage)	16.2 7.5 16.3		16.8 8.3	8.4 4.2	7 7 6%	4	5 2 5 2 8 2	534	189 22½ 78	5 4 10	5	4 3 8	8 6 9	12 21 22	Very good Very good Fair	No stray light, A very slight amount of light was visi
12 We	ill Bros	17.8	.68	-	-	53%	3	5 2	71/2	431/2	13	5	13	3	21	Fair	A small amount of light issued from
13 Var 14 Rus	ndervell & Coshmore Lamps, Ltd	18.9 19.1	.72	13.7	12.4	65% 63%		2 3	01/4	196	26 14	4 7	25 13	6	7 27	Good Very good	the ventilating holes.  No stray light.  A very slight amount of light was vis
15 Do. *16 Sal 17 Syl	ax Motor Access. Co			21.4 — 21.0	12.1 4.0 14.1	65% 65% 73% 43% 75%	5 1 5 1 11 7 1 8 1	3 2 8 2 4 2 0 3	7 7 81⁄2	81 57 84 851/4 93	15 3 13	3 4 9	15 3 11 15 17	8 0 6 0	5 30 35 16 27	Very good Very good Very good Fair Very good	ble from the rim of front of lamp. No stray light. No stray light. Practically no stray light. No stray light. A small amount of light was visible.
19 Ref	lector Synd., Ltd	22.5	.79	-	-	73%	12	4 2	836	9756	12	7	11	4	36	Fair	through a row of small holes. Slight amount of light issued from
20 Do.	Shmore Lamps, Ltd (½ eclipsed)	22.7 22.7 23.6	.83 .83 .80	Ξ	1111	7% 7% 9	11 11 10 1	3 2	4 10%	75 27 126	8 2 13	7 11 9	5 0 13	5 0 1	29 33 30	Good Good Fair	holes on the top.  No stray light.  No stray light.  Light issued from ventilating holes is the cowl, and from a row of holes of
22 Wy	ncott & Son	24.5	.82	-	-	6%	1112	3 2	6	69	6	10	3	9	26	Fair	the top. A small amount of light issued from
23 We	ill Bros	25.0	.95	_	-	85%	8 :	3 2	6	97%	11	9	9	7	29	Good	the ventilating holes.  Very slight amount of light issued from holes on the top.
24 We	ill Bros	25.6	.85	=	-	85%	9	8 2	8	93	9	11	10	2	27	Good	A large amount of light issued throug a long narrow aperture.
25 B16	riot, Ltd	26.0	.81	-	-	9%	16	0 1	10	132	21	6	19	2	27	Fair	A considerable amount of light issue from the top.
26 Wo	rsnop & Co., Ltd	26.2	.91	-	-	834	12 :	2 2	6	54	18	11	15	6	12	Fair	A very slight amount of light was reflected from holes on the edge
27 Mo	tor Access, Co	26.3	.81	_	-	776	12 1	2	4	75	13	9	12	2	8	Good	A bright light issued from the veni
28 Hov 29 Bro	wes & Burley, Ltd	28.7 32.2	,95 .95	7.7	$\overline{z}$	7½ 9½	7 16		1 10	78 187½	†21 22	3 9	1 22	1 3	7 7	Good Fair	lating holes. No stray light. Light issued from two ventilating hole
29 Do.	(eclipsed)	32.2	.95	_	-	916	16	1 2	10	24	16	11	16	10	7	Fair	in the cowl. Light issued from two ventilating hole
30 Van 31 W.	dervell & Co Tweer & Co	33.0 37.7	1.07	22.3	12.4	73% 73%	6 16 8 (		8	160½ 93	20 16	8 7	20 16	10 8	9	Good Good	in the cowl.  No stray light. Light issued from round cowl, an there were reflections toward the
132 Bié 132 Do	riot, Ltd (without louvre)	76.9 76.9	Ξ	68.3 68.3	13.0 13.0	934	12 1		10	168 216	20 25	5 7	17 23	8 7	30 7	Fair Fair	wings. No stray light. No stray light.
33 Blé	riot, Ltd	181.0	-	-	=	10%	23	5, 2	1	1032	31	10	30	10	10	Very good	Some light was thrown back from the

<sup>&</sup>quot;In the case of the acetylene burners, the candle power (s) and consumption (b) correspond to a pressure of 3 in. of water.

† This width was broken by two small patches where the intensity of the light did not quite reach the standard. (See beam diagram.)

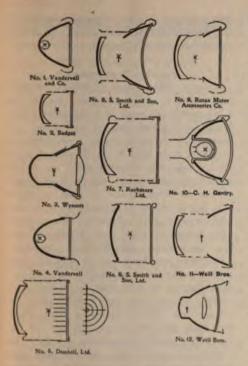
1 Nos. 6, 8, and 19.—Fitted with gold-plated reflector.

Nos. 25 and 33.—Fitted with fixed, blackened, horizontal slats behind front

§ No. 5.—Fitted with flat, blackened, circular slats behind front glass.
¶ No. 20.—Fitted with flat, blackened, horizontal slats behind front glass, movable by hand.

No. 16.—Fitted with front lens cut horizontally into a large number of sections, the adjoining faces of which are frosted.

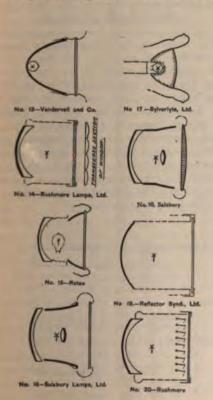
†† These lamps are self-contained; the weight therefore includes that of the generator.



somewhat overrun, and if this practice became general it would lead to objectionable results, on account of the blackening of the bulbs and premature breaking of filaments. The candle power of the electric lamps shown in Table II, column a, corresponds to the voltage at which the lamps were actually run during the tests.

A series of experiments were carried out to ascertain the effect on dazzle of varying the vertical angle of projection of the beam and the height of the lamp itself from the ground.

The figures given in the following Table IV. represent in general the results of the



tests made. The figures in feet in the different columns are the distances of the observer from the lamp at which he was no longer dazzled—a similar set of observations to those shown in Table II, column k.

Table IV.—Effect of Height and Angle of Elevation Upon Dazzle.

	Height of Lamp from Ground.								
Angle of Elevation.	2 Ft. Ft.	3 Ft. Ft.	4 Ft. Ft.	5 Ft. Ft.	7 Ft. 6 In. Ft.				
20 deg. up									
- Notice of the contract of the	77	32.00	3.5	220	3.5				
10 deg. up	55	431/2	42	28	55				
5 deg. up	571/2	46	45	33	**				
o deg. (horizontal)	57	45	39	22	59				
5 deg. down	64	35	3436	23	**				
10 deg. down	62	36	261/2	24	51				
the same of the same of			-						

This table shows that the least dazzle is obtained either when the lamp is very low down (2 feet from the ground), or when it is fixed above the canopy level (7 feet 6 inches above the ground). When the lamp is at, or about, a height of 3 feet from the ground, a downward tilt increases the dazzling effect. The judges are of opinion that this is due in a measure to reflection from the surface of the road, although this was not as light in color as is often the case.

When the lamp was tested below the level of 3 feet from the ground maximum dazzle was obtained with an upward tilt. Nevertheless, the effect on dazzle of tilting the lamp within reasonable limits is unimportant.

Undue tilt of the lamp causes considerable difference in the illuminating power, whereas height has an appreciable effect in diminishing the dazzle. The best position would appear to be at 2 feet.

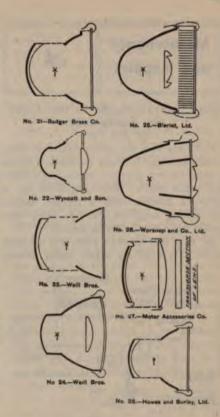
As regards illumination the horizontal is the best position from the driver's point of view, except at a height of 7 feet 6 inches, when a slight downward tilt is desirable.

The automatic anti-dazzling devices other than specially arranged mirrors or lenses appeared in every case to diminish the range, but in one case this effect was only slight.

Three lamps were provided with gold reflectors, a development which is expected in consequence of the color to prove of advantage in time of fog. It was not possible to adjudicate, in this respect, upon these or other lamps with similar claims, owing to the absence of fog during the test.

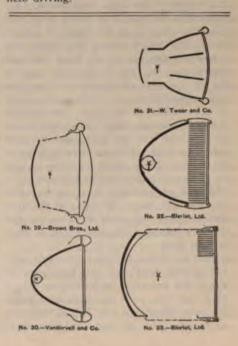
Appliances can be added to almost any type of head lamp whereby the light may be reduced; for example, with electric lamps by a switch diminishing the voltage or inserting resistance, and with acetylene lamps by partly or wholly obscuring the light by means of hand-actuated shutters or screens. The advantage of such a hand-actuated device is that on entering a town the intensity of the light from the head lamp can at once be moderated.

The lamps have been tested singly, but in many, if not in most cases, users employ a pair of lamps. It should be noted that a wider beam is required from a lamp which is to be used singly.



# Noiseless Universal Joint for Magneto Drive.

A simple method of flexibility connecting a magneto to its driving shaft that is used on one of the latest English trucks, and that would seem to be particularly applicable where a magneto is fitted to an old car, consists in securing fork shaped castings to the ends of the magneto shaft and the driving shaft and bolting the prongs of the two forks to a heavy leather disc, at right angles to each other. This affords a perfectly universal drive, and one having the advantage of absolute silence over the ordinary universal couplings used for magneto driving.



# Maintenance and Repairs



# Some Improvements to the Lighting Equipment. By JAY TEEL.

For some time my father has been using a runabout for business purposes. It has a one cylinder gasoline engine with make and break spark. For ignition it has a governed dynamo with a storage battery for starting purposes, the two being con-

At first the car had only two oil side lamps, and when my father began driving

trolled by a double throw switch.

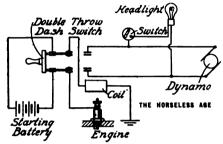


DIAGRAM OF WIRING.

much at night he found that he needed a headlight, as the roads of this vicinity are very rough and rocky. He purchased a 7 inch, mirror lens headlight and had a piece of metal rod bent into a fork to fit it. The next thing was to fit it to the car. As the dash of this car is really a large door, hinged at the bottom, the lamp could not be put there. As there is a metal rail just above the dash, and the bonnet of this car slants downward along its entire length, the radiator being carried below the frame, it could not be conveniently placed on top of that. It was finally decided to place the lamp in front of the bonnet, fastened to the bottom of the angle iron frame. My father had two pieces of heavy strap iron joined together so as to form a T section piece. The lower part of the T does not extend all the way to the front end, and toward the rear has a strip cut away at the top just wide enough for the iron plate to be slipped through. There are two pairs of holes drilled in the plate. Through the forward pair go two lag screws which are screwed into the body, and the rear pair hold bolts which go through holes in the frame. These cause the plate to hold the T section piece clamped firmly in place. The front end of the T piece was forged to conform with the cross section of the fork. Another piece was made to fit on top and the fork was held clamped firmly in place by four bolts.

First my father bought a generator with a "capillary feed" for the headlight. It was a \$16 generator, but he obtained it for a good deal less, as it had been used some. We soon discovered why it had been sold so cheaply. At the first trial it worked

finely. There was a large white flame at the burner which, reflected by the mirror, gave a broad white beam of light, which sl.owed all the rocks and ruts, and flooded the road for some distance ahead with its light. After the auto had been put back into its house, however, and the water turned off from the generator, the lamp did not go out.

"It will be all right," I said. "Just let it burn a few moments until the gas already made is burned, and then it will go out." We left it. About an hour and a half later my father went back and found it burning its brightest. He then unhitched the tubing from the generator and emptied out the water. When we investigated we found that the carbide chamber was a sort of horizontal pipe. It was divided lengthwise into two parts. The upper part extended more than half way to the bottom. The lower part extended beyond and outside of the upper part and was clamped to it when the water was turned off. Against the outside of the pipe thus formed flowed the water, and turning the latter on was merely loosening the clamping device. Particles of carbide lodged in the cracks between the two parts and thus prevented the flow of water from being stopped.

My father next tried a generator in which the water is above the carbide. When the key is turned the water drips down into it. This worked a little better, but it was affected somewhat by the vibration of the car and it was found expedient not to put the water in until the lamp was to be used and to empty it out again when it was put out.

Probably neither of these would be called first class generators, but my father neither wished to pay a high price for such an article nor put up with such poor ones as we had. He had the output of the dynamo measured and found out how much current was not needed for ignition purposes. He had an electric lamp socket put in place of the gas burner in the headlight. He fitted it with a tungsten lamp, wired as shown in the sketch of the dynamo wiring. He has used this ever since, and there has never been the least bit of trouble from it. The light is always ready at a turn of the switch key, and the lamp gives plenty of light. I do not think the total outlay in this case amounted to two dollars. It was merely the best and most convenient solution of the problem. Gas was not discarded for electricity as a whim or experiment. It was only a matter of which was the least troublesome and expensive.

#### Valve Treatment.

Many a difficult case of missing at very low speeds has been accounted for by the valve stem being loose fit in the valve guide. Most valve guides are of cast iron. If, however, it is necessary to bush them an excellent bush may be made out of mild steel, provided it is carbonized, i. e., soaked in carbonizing material such as bone, burnt leather, or scintilla, for an hour or more at a bright yellow heat closed up in a pot. Thus treated, mild steel will replace (more advantageously) cast iron anywhere, and has remarkable anti-friction properties. This same treatment can be applied with great success to all valves. Care is necessary not to attempt this to nickel steel valves, or any but mild steel valves of .18 per cent. carbon content or less. They then have the virtue of not pitting, and the stems practically never wear at all. The Talbot Company's valves were always case hardened all over, and corrected by grinding after hardening, and it is well known that up to the end of 1908 that company had never changed a valve whatsoever.

Speaking of valves, another mysterious cause of apparent misfiring hard to locate was when the valve stem was too good a fit in the valve guide, and occasionally stuck up instead of coming down.

Another discrepancy has been found in many repair shops. The part of the cam which should have been truly circular was not so, and a bump or prominence left on the back sometimes lifted the valve slightly off its seat, and often caused the carburetor to ignite.—The Autocar.

# New Mode of Travel.

A new method of travel was tried out this month by the United States Senate Committee on Irrigation and Reclamation of Arid Lands, which left St. Paul, Minn. on August 12, and reached Portland. Ore on August 22. The committee traveled by a special train on the Northern Pacific. The train comprised a number of automobile combination cars, two baggage cars and a number of automobile cars for transporting automobiles, by which the party made side trips of inspection at a number of points. The automobile cars were veritable garages on wheels.

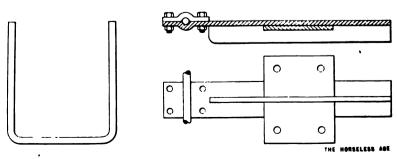


DIAGRAM OF HEADLIGHT BRACKET.

# **NEW VEHICLES AND PARTS**

# The Flanders Twenty.

This new car is being manufactured in the Detroit factory recently occupied by the De Luxe Company, but now owned by the E-M-F Company. It is being made in a separate factory by a new organization, but under the experienced control of Mr. Flanders, of the E-M-F Company, and his associated manufacturing experts. The cars will be marketed by the Studebaker Company.

The car is designed especially for manufacture in very large quantities, an output of 25,000 being promised for the first year. It presents, therefore, many features which may appear radical at first sight, but closer inspection will show that they are logical developments which are to be expected as the number of cars to be manufactured in a season increases.

#### THE SAVING IN ASSEMBLING.

The feature which most strongly attracts attention at the outset in inspecting this car is the manifold uses of the tubular underframe. Tubular underframes are not new: they have been used both in this country and abroad, but they have usually carried only the motor and change gear. In this car the two parallel tubes carry nearly everything, viz., motor, radiator, dash, steering gear, pump, magneto, coil. The change gear is mounted on the rear axle. Thus the entire power plant is assembled on the bench and put in place in the frame as a unit. If the cars are being used for commercial purposes this unit may be removed for repairs or adjustments and replaced by a spare unit. The same thing may be done in any city where a considerable number of these cars are used for pleasure purposes. In this way, barring some accident which would completely wreck the car, a machine can be kept in service all the time.

### THE MOTOR.

The bore is 35% inches and the stroke 334 inches. All four cylinders are cast together. The valves are in pockets all on one side, operated from a single cam shaft by straight tappets. The valve chambers are closed by screw plugs. The top of the water jacket is cast open, and is closed by a pressed steel cover, retained by four studs, one at the centre of each cylinder head, which draw it down tightly on its gasket. Its edges are flanged downward to retain the gasket. At its front end a short pipe is pressed out at an angle of about 30 degrees with the horizontal, to take the hose connection to the radiator.

The valves have beveled seats, are 11% inches in clear diameter, and slide in guides pressed in from the outside. The springs are cylindrical and are retained by a pressed steel cupped washer which is fastened by a horseshoe shaped washer that fits a groove turned in the valve stem. They are operated by tappets of nearly rectangular section, which slide in die cast guides that are fitted into bosses cast on the bottom

flange of the cylinder castings. Their section prevents them from turning, which allows of the ends being rounded like a roller. A hard fibre plug is placed in the upper end. These tappets are made very hard, with the length to gauge. Valve seats are machined to a uniform height from the cylinder base. The valves are all made exactly the same length, and the cams are ground. In this way uniform timing is secured without adjustment.

The exhaust manifold is cast with the cylinders, and its side is provided with cooling ribs. The outlet to the muffler is through a flanged connection at the rear. The two openings to the inlet valves are underneath the valve pockets. A Y pipe leads to the carburetor.

The crank case is of the barrel type, with open ends. It has four holes in the top where the connecting rods pass through, and four holes in the bottom for adjusting the connecting rod bearings. These latter holes are closed by plates, held by studs and yokes. The crank shaft is of the two bearing type, drop forged, with pins 118 inches in diameter, and 134 and 134 inch front and rear bearings, respectively. The flywheel is pressed on a taper, secured by a Woodruff key and held by two lock nuts with a slotted washer between them.

The crank shaft bushings are die cast of special bearing metal. On the first cars the crank case will probably be made from a special gray iron, but dies are being developed to make them from drawn steel.

The crank case ends, which carry the crank shaft bushings, are cast with arms whose ends are bored to take the underframe tubes. These arms are slotted and fitted with clamp bolts. The support for the bearing is fastened to the crank case end plate by ribs so that the splash can' fall into large pockets on top and run back into the crank case after lubricating the bearings. All parts of the motor are lubricated by splash, which is supplied from two crank case compartments. The oil level is maintained by vacuum feed from a pressed steel tank at the side, supported from one of the underframe tubes. This is the system used on the E-M-F cars during the past year.

The cam shaft has three bearings, and integral cams. All its working parts are ground. The cam shaft and magneto driving gears are of the single spiral type. They are enclosed in a pressed steel case, but this case is simply a housing and does not support the gears in any way. The gears are rigidly supported by the crank case, and the centre distances are kept very accurate, so they may run as quietly as possible. A projection on the front part of the gear case carries the starting crank, which is pulled out of engagement by an outside spring.

The pump is of the centrifugal type; it is mounted on one of the underframe tubes and is driven by the magneto gear. It is at the centre of the motor, and delivers water just below the two middle exhaust

valves. The radiator consists of two tanks connected by quarter inch vertical tubes surrounded by continuous horizontal fins. It is made up rough, and is surrounded by a finished cover whose shape closely resembles the well known Studebaker design. This allows of the radiator being readily repaired. It is carried on two brackets, which are pinned and clamped to the forward ends of the underframe tubes. The fan is driven from the cam shaft by a flat belt.

A Splitdorf magneto supported on one of these tubes supplies current for regular running. Starting current is furnished by dry cells. The coil is in a cylindrical hard rubber case secured to the under side of a tube. The cut-out switch is mounted on the dash, and the only wire leading away from the motor is the low tension wire to this switch. This dash, by the way, is made from pressed steel, shaped so as to resemble a flat wooden dash about fiveeighths of an inch thick. It has the support for the rear end of the hood pressed integral with it. The clamping bolts for the year legs of the motor extend upward and support the dash.

The clutch is of the leather faced reversed cone type. Both male and female cones are made from pressed steel. The spring is a large diameter conical one. A ball thrust bearing takes the spring pressure when the clutch is disengaged. The cone runs on a die cast white metal bushing.

Back of the clutch is a single universal joint consisting of two forks with radial pins connected by a ring split in the plane of rotation. The squared hubs of the joint forks are free to slide a little fore and aft so that the joint may centre itself with the surrounding globe.

This globe joint, which is secured to the front of the tapered tube which surrounds the propeller shaft, is of a new type. It consists of a pressed steel piece, considerably less than hemispherical, which contacts with the outside of a hemispherical projection pressed in the cross member of the frame. Through slots in this cross member globe it is bolted to a zone ring which takes the thrust when the brakes are applied or the reverse is engaged. The front of the joint is enclosed by a cover of thin pressed steel.

The propeller shaft and differential casing are mounted on cup and cone ball bearings. Driving bevels and change gears are carried in a malleable iron case open at the sides. This forms the centre of the rear axle housing, as in the E-M-F Thirty. The gears are 6-8 pitch. The fixed gears are keyed and pinned, and the sliding gears are mounted on a square shaft. Cup and cone bearings are used throughout, except back of the pinion shaft, where an annular ball bearing is used, since the thrust must be taken in both directions.

The direct drive clutch is of the internal-external gear type. The lay shaft is above and the shifting rod below. Two speeds and a reverse are obtained with a single shifting rod.

The differential is of the bevel type with two pinions. Its case is of pressed steel, and the driving gear is bolted between the halves. The case is mounted in cup and cone ball bearings carried in vertically split supports, which are cast with the gear case. The sides of the case for the sliding gear have large hand holes, which are closed by pressed steel covers. The remainder of the rear axle housing is formed from two conical pressed steel pieces, which close the sides of the driving gear case, and two tapered tubes which are brazed into the cones. and which form covers for the axle shafts and supports for the bearings and springs. This construction gives a light axle of large diameter which does not need a truss rod.

The axle shafts are secured in the differential gears by a tapered fit, key and lock nut, and are fastened in the wheels in a similar manner. Hyatt bearings are used at the wheels, 4 inches long, with one-half inch diameter rollers.

The front axle is a drop forging made in a single piece. The axle bends down outside the spring seats and is also curved downward between the seats. The seats are separate, and the springs are secured by a single wide clip, which passes through the centre of the axle, surrounded by a spacer between the flanges of the channel.

The knuckles are forged and are bushed with bronze. The knuckle pins are hardened and have nuts at the bottom. The wheels are ball bearing and have 11/2 inch spokes.

The front springs are semi-elliptic and the rear springs are scroll head full elliptic, shackled at both ends. They are 13/4 inches wide. The rear spring seats are of pressed steel and turn between collars fast on the axle tube. The springs turn on pins secured to the frame, so by removing them from these pins and taking out the four bolts in the globe joint the axle can be removed from the car.

The frame is of pressed steel, neither dropped nor narrowed. The power unit is supported on a cross member in front and by two saddles under the rear motor legs, making a three point support.

Both sets of brakes expand inside the rear wheel drums. They are 9½x1 inch. cam expanded, cast iron shoes against pressed steel drums. Neither set is equalized. One set is operated by the pedal which throws out the clutch and the other by a hand lever. The levers and pedal are made from channel section pressed steel with forged ends.

Steering is by a worm and sector gear, which is fastened to the tubular underframe and to the pressed steel dash. It is cross connected to the left knuckle. Spark and throttle are controlled by levers under the wheel.

The body is made from pressed steel. It is of the same type as the Studebaker "Suburban." The rear seats are removable, and when they are off there is a large carrying space at the rear.

Each side piece below the seats is pressed from a sheet of steel, and is given a paneled effect by half oval ribs raised by pressing. The rear end is made in a similar manner. The sides and rear are fastened together by corner moldings and screws. The cross members, also of pressed steel, are fastened in by moldings and screws. The seats are of pressed steel bolted to the under body. Upholstering is done over a pressed steel frame, which fits down outside the top of the seats a little way, making a neat job. The flooring and sills are of wood, assembled and slipped inside the side sheets.

Body, frame, axles, and, indeed, all parts but the wheels, are finished in baked enamel. The wheel base is 100 inches, and the tread is standard. The wheels are 32 inch, with 3 inch tires.

With its readily removable parts, body with room for baggage, and its durable baked enamel finish, the new car promises to be suitable for many business purposes as well as for pleasure uses.

### Allen-Kingston Gunboat Body.

A new light weight four passenger aluminum body has been brought out by the Allen-Kingston Motor Car Company, of New York. It is called the "Gunboat" body, and is of the type first introduced by the Daimler Motor Company during the 1908 Prince Henry Tour. The body is very low, as the frame is dropped in front of the rear axle, and the seats are also low. A large, flaring hood extends back from the dash, almost hiding the low raked steering wheel from the front. The sides of the body form continuations of this hood, and the outline is quite smooth to the bulging stern back of the rear seat. Access to the front seats is by a door at the left, and the tonneau is entered by a door at the right. There is a large carrying space in the stern which can be reached by swinging up the upholstery of the rear seat, after removing the cushion. This body is claimed to greatly reduce the eddy currents at the back of the

car, owing to the smooth sides and projecting back, so that the rear passengers are less troubled with dust than in the regular bodies.

# An Ampere Hour Meter for Electric Vehicles.

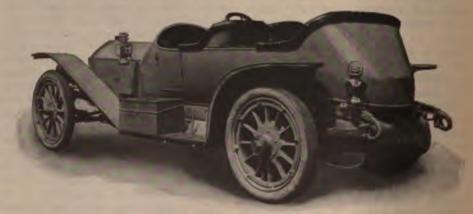
In the operation of an electric vehicle it is extremely desirable to know at all times how far the discharge has progressed, and consequently how much available energy still remains in the battery. An indication of the mileage which has been covered, up to a certain time, upon a particular charge, gives but a very crude idea of the actual draft which has been made upon the battery, unless



AMPERE HOUR METER.

the same roads, always in the same condition, are always traversed. When strange roads are traveled, with widely varying grades and surfaces and under diverse weather conditions, the mileage which has been covered is nearly worthless as an index of the remaining mileage capacity of the charge, and the operator is likely to be deceived into going so far from a charging station that, when exhaustion of the battery is indicated by a rapid fall in voltage, it may be difficult or impossible to reach a source of electrical supply.

In order to afford a continuous indication of the total of electrical energy discharged from a vehicle battery in operation, and thus to allow of an estimate being made of the energy remaining to be utilized, the Sangamo Electric Company, of Springfield, Ill., have brought



ALLEN-KINGSTON "GUNBOAT" CAR.

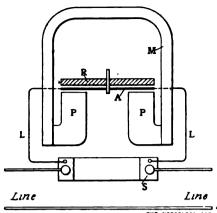


DIAGRAM OF SANGAMO D. C. AMPERE HOUR METER.

A. copper disc armature immersed in mercury; its shaft drives the recording train; L.L., leads from shunt S to chamber in which A is enclosed, carrying a certain portion of the load current to and from A. M, powerful permanent magnet, producing field which acts on curent through A to cause rotation. P.P., soft iron pole pieces to which M is bolted. R, soft steel plate above A, in the mercury chamber, acting as a return path for magnetic lines. S, shunt carrying greater part of load current; used in all sizes above 10 amperes.

out a special type of integrating ampere hour meter, intended for installation upon electric vehicles of all kinds. This instrument may be mounted upon the dash and affords a continuous reading, which is equivalent to the product of the average current in amperes which has been drawn from the battery up to the instant in question, and the time in hours during which this current has flowed.

The device is essentially a motor meter, the same in principle as the house meters on electric light circuits; but indicates in ampere hours instead of in watt hours. The moving element is a pivoted disc-like structure, through which the battery current passes diametrically from fixed, unspillable mercury contacts. Stationary permanent magnets, arranged in close proximity to this disc, react in such a manner upon the current flowing in the disc as to produce motion, and an aluminum dampening disc, turning between permanent magnets of its own and carried upon the jeweled shaft which supports the motor disc, reduces the rate of motion to proportionately with the current to be measured. An integrating train of clockwork, moved by the disc shaft, actuates a pointer which sweeps over a scale graduated to ampere hours.

The moving elements are buoyed up by the mercury, which is enclosed in a tight compartment for contact making purposes, and relieves the jewel bearing of most of the weight of the mechanism. The mercury also acts to dampen the effect of shocks, and it is claimed that these instruments may be used for long periods upon vehicles subjected to severe vibration without detriment.

By the employment of various ratios in the gearing and other modifications, these instruments may be given any desired range as to maximum current and total indication, and thus may be made suitable for installation on electric vehicles of all sizes. Instead of indicating upon several small dials, in units, tens, hundreds and so forth, this instrument is fitted with a single dial reading from zero up to a number of ampere hours somewhat in excess of the capacity of the battery with which it is to be used. It is so connected into the vehicle circuits that all current entering the battery for charging purposes and all that leaving it, as discharge, passes through its motor disc. When charging current is passing through it the indicating hand moves in one direction, and when the battery is discharging the hand moves in the opposite direction. If, then, the pointer is placed at zero and 150 ampere hours of charging current, for instance, is passed through it, the hand will stand at 150, and if the battery were perfectly efficient 150 ampere hours could be drawn from it. During the discharge the hand would gradually recede toward zero, and its indication, at any instant, would register the remaining ampere hour value of the charge. Since, in practice, the ampere hour efficiency of a battery is always less than unity-80 per cent. is a fair figure—it is usual, after the charge is completed, to set back the hand toward zero an amount equal to the expected loss in ampere hours. For instance, if 150 ampere hours are recorded upon the charge, the hand may be set back, manually, to 120 ampere hours, and the indications of the hand, during discharge, will correspond, quite closely, to the remaining ampere hours in the bat-

The known efficiency of the battery will determine the amount of this required allowance, and at the same time any change in efficiency will at once become evident by a failure to realize in service the expected ampere hour capacity.

A substantial cover protects the instrument, and the device for resetting the pointer is operable only by the use of a special key which is carried by the owner. If the instrument be left reading zero at the time a charge is ordered the indication of the meter, when the owner takes the car as charged, is pretty good evidence that that number of ampere hours has been put into the battery.

It then only remains for the owner to free the pointer setting device by means of his key, and to deduct from the indication of the instrument the number of ampere hours which experience has shown the battery in its then condition to lose per charge, when its succeeding indications will very closely represent the remaining ampere hour capacity available.

These instruments are fitted with a contact device, operated by the pointer when it reaches a predetermined point on

the scale representing the usual ampere hours of charge. This contact device, when used in connection with a relay, a source of current and an electrically tripped switch in the charging circuit, provides for the automatic termination of the charge at the desired stage and frees the owner from the necessity of watching his battery during the charging operation. The results obtainable by this method should be much more exact than by the use of a time switch, and probably more certain than by relying upon the rupture of the arc in the mercury rectifier, due to the rising of the voltage of the battery.

Overcharges and overdischarges are at once indicated by the pointer passing above the predetermined point of full charge on the one hand and by the pointer receding past zero on the other.

The B. & S. Igniter.

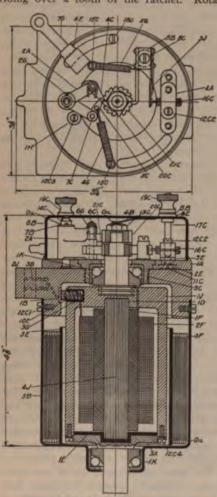
The Briggs & Stratton Company, Milwaukee, Wis., are manufacturing an ignition equipment designed along novel lines. The complete outfit, with the exception of the battery, is mounted directly on the engine. The igniter forms a cylindrical block 31/4 inches in diameter by 5 inches high and comprises a non-vibrating spark coil with condenser, a mechanical circuit breaker, a high tension distributor and means for timing the spark. Since a mechanical circuit breaker is used, only one spark is produced per ignition, and one of the chief claims for the igniter is its high current economy, it being stated that a four cylinder engine can be sparked with this outfit for 2,500 miles on one charge of a six volt, 60 ampere hour storage battery. The igniter is intended to be fixed to the engine frame and to be driven by means of the vertical shaft usually provided for driving the timer.

The rotating part or rotor consists of a vulcanized hard rubber case with a bronze spindle at each end. The upper spindle is molded into the rubber, while the lower one is secured to it by screws. The high tension distributor brush is located near the upper end of the rotor and is directly connected to the high tension end of the seondary winding inside the rotor case. One end of the primary winding is connected with the upper spindle and the other with the lower spindle. The rotor carries both the primary and secondary coil windings and the soft iron wire core, and is mounted on ball bearings. Both windings of the coil consist of enameled wire, which makes the coil very compact, and at the same time insures very effective insulation. The enamel insulation will also resist heat better than the regular silk or cotton insulated magnet wire. After the rotor is assembled it is filled with a special hard wax to hold the different parts of the coil in place.

The igniter comprises an outer containing case consisting of a drawn aluminum shell. The space between the rotor and the walls of the aluminum shell is taken up by the con-

denser. The latter is insulated with a special grade of paper imported from France, and is so designed as to eliminate eddy current effects within itself. The high tension distributor block consists of molded hard rubber and has the metal parts cast in. The sides and face of the block are ground and polished.

The most interesting part of the igniter is undoubtedly the contact breaker, which involves a new mechanical movement and is claimed to produce a contact of absolutely uniform time regardless of the speed of the motor. Referring to the plan view of the circuit breaker, the four point cam 20C is keyed to the shaft of the rotor and rotates with it at cam shaft speed. The dog 4C is caught by the cam 20C in its path of rotation and advanced, carrying with it the bell crank 2A and bell crank 5C until the hook 5C has advanced one tooth on the periphery of the ratchet 21C. At this point the dog passes out of the path of the cam and the bell crank carrying the hook and dog is returned to normal position against fibre stop 1H by spring 4G. As the ratchet is free to turn on the shaft, this return of the bell crank will rotate the ratchet onetwelfth of a complete turn, as it has twelve teeth. At each advance of the ratchet the contact points on screw 16C and spring 3J are instantly brought together and separated by the finger of the contact maker riding over a tooth of the ratchet. Rota-



B. & S. IGNITER

tion of the shaft backward will produce no spark, as the cam will not engage the dog on a backward movement. All parts of the contact maker subject to sliding contact are milled from tool steel, hardened and tempered after being polished. Large iridioplatinum contact points are used. All springs used on the contact maker are wound from German piano wire.

In order to advance or retard the spark the cover plate is rotated between stops on the distributor block. The distributor block and outer case are not shifted, and the case may be rigidly secured to the engine base, thus eliminating the wobble common with timers. The secondary wires are not moved when the spark time is advanced or retarded, hence they can be securely fastened in place. The high tension terminals are provided with a retaining device which makes it impossible for them to shake loose.

# Stewart Ball Bearing Swivel Joint.

A patented and exclusive feature of the 1910 Stewart Multipolar Speedometer will be a ball bearing swivel joint which elimi-



STEWART SWIVEL TOINT.

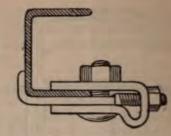
nates the bends in the shaft, permitting the shaft to be carried back along the frame of the car directly to the speedometer.

# Mesinger Double Check Spring.

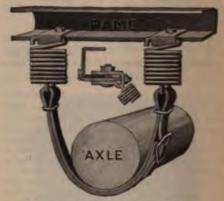
In addition to their single rebound check spring the H. & F. Mesinger Manufacturing Company, 1801-1803 First avenue, New York, are now offering a double check spring which is designed for cars that have full elliptic springs. The single spring cannot be attached to such cars because spring clips, bumpers or brake parts are in the way. The firm says that this spring can be put on any kind of car. They have also made an improvement in the clamp which fastens the spring to the frame. When attaching, the small nut is drawn tight, so that the bolt is pressed tightly against the frame, and then the large nut is tightened.

# Badger Motor Car Company to

Build Five Hundred Cars. The output for 1910 of the Badger Motor Car Company, of Columbus, Wis., will approximate 500 cars, in three models, all on the same chassis, as follows: Four passenger toy tonneau, two pasenger roadster and five pasenger touring car. The price is \$1,500. A four cylinder, 4x4 inch Northway motor, manufactured in Detroit, is used. The motor has a self contained oiling system and a thermo-siphon cooling system. Motor, clutch and transmission are assembled as a unit power plant. The transmission is of the selective type, giving three speeds forward and a reverse, and is



SPRING HOLDER



MESINGER DOUBLE SPRING CHECK.

equipped with F. & S. ball bearings and Brown & Sharpe gears. Many of the parts are designed by E. W. Arbogast, general manager and a director of the company, and will be produced in the Columbus factory. The company owns 22 acres on the main line of the Milwaukee road from Chicago to the Twin Cities, and a building, 50x150 feet, one story high, is now being erected. A. M. Bellack is president, Christian Kurth vice president, G. C. Holtz secretary, J. R. Wheeler treasurer, with William C. Leitsch an additional director. Webb Jay & Co. have been appointed Chicago agents for the Badger cars.

# Additions to Indianapolis Factories.

The Premier Motor Manufacturing Company, Indianapolis, Ind., has secured a building permit for the erection of a new factory building at Shelby and Georgia streets. It will be a two story brick structure and cost approximately \$15,000, according to the estimates.

The National Motor Vehicle Company, Indianapolis, Ind., will shortly let the contract for a \$25,000 addition to their factory at Twenty-second street and the L. E. & W. Railroad. The floor and roof of the building will be supported by a truss construction which does away with interior pillars. The building will be 154x200 feet and partly two stories high.

# Model Automobile Company Now Great Western Automobile

Company.
As an indication of their intention to broaden and extend their business the Model Automobile Company, of Peru, Ind., have changed their name to the Great Western Automobile Company. No change of membership or management is contemplated.

# COMMUNICATIONS



# Feeding Gasoline from Gravity Tanks on Steep Hills.

Editor Horseless Age:

I note the letter of J. S. Corbin in one of your recent issues, and wish to go him one better. Take an angle brass check valve with a brass ball and solder it tightly to the tank, run a one piece one-quarter inch copper tube to the dash, using unions with ground joints. To the dash fit a 1½x1 inch Lunkenheimer brass air pump. Then you have a fine equipment at small cost—one that is always ready for use, and that is very easily worked, too. There are no rubber parts to cut out, and the arrangement will outlast several cars. The pump has a cut-off which can be closed in case the check valve does not hold well.

As far as the system is concerned, if anyone wants something very cheap he can get a 25 cent bicycle pump and fit it to the dash. This is not quite so neat, the pump being a little longer, and the shortest pump that can be found should be used. The litthe brass pumps above referred to cost from \$1.50 to \$3.

If Mr. Corbin was as fond of the steamer as I am he would have no hill trouble. We do most of our pleasure driving over the mountains, about 5 miles from my home, as we find it much more pleasant to drive over the wooded mountain roads than over the fine level State roads running through the valley where we live. There is a sameness about this road, and it is about the hottest place one can find to drive. With a good steamer the hills are no obstacle, and such a car will travel over mountain roads all day long with perfect ease. As stated above, driving under these conditions is much more enjoyable than to drive on the J. HARRIS WIGHT. hot State roads.

# Electric Searchlights. Editor Horseless Age:

I have read the articles concerning electric lamps for autos which have appeared in your paper with considerable interest. I note that some makers of electric equipment furnish silver parabolic reflectors to replace mirror lens reflectors. I understand, however, that naval searchlights use mirror reflectors. Can you inform me through the columns of your paper which is the most efficient for electric searchlights? Would an electric lamp, with its socket screwed in place of the gas burner and its filament the same height as the flame, be in exact focus with the mirror?

[We cannot tell you whether the parabolic reflectors or lens mirrors are the most efficient. One reason why silvered parobolic reflectors are not used with electric arc lights and acetylene lights is that they would not stand the heat.

J. T. L.

The focus of a parabolic reflector is a point, and since an acetylene flame and a tungsten filament both have considerable dimensions, they cannot be in the exact focus of the lens. But presumably the acetylene burner was adjusted so the central point of its flame coincided with the focus, in which case the electric light will also be properly focused.—ED.]

# Two Cylinder Crank Construction. Editor Horseless Age:

I would like to ask the following questions, to be answered in your columns. In building a two cylinder, vertical, four cycle motor, are the cranks placed opposite so as to balance the reciprocating parts, or do they place them both on one side and have the impulses at equal intervals?

What are the objections to the friction transmission?

T. P. CHASE.

[Both constructions of two cylinder cranks are used, but that with crank pins opposite seems to be most popular at present. A double cylinder vertical engine with both pistons moving up and down together will vibrate very strongly, unless some special balancing method, like that on the Oakland two cylinder cars, is employed.

The chief objection to friction transmission is that it is not positive. Another objection is that wear of the friction surfaces is rather rapid, but this objection is reduced in importance by the fact that the friction materials can be renewed at slight cost.—ED.]

# The Enameling or Baking Process for Finishing Automobile Bodies. Editor Horseless Age:

Practical men are becoming aware of the fact that the all metal body as used on automobiles and railroad cars demands some different method of finishing than that which has so far been used for all good coach or car bodies. The considerable time required in the ordinary process for the different coats to dry is the cause of much delay in getting out work, and also requires increased floor space for keeping the work moving.

Some of this floor space might be set apart and fitted up with steam pipes or some other arrangement for heating it to a temperature of 160° Fahr. The space should be large enough to hold one day's work. Grind the color in a good grinding varnish bought in paste form and mix with a good mixing varnish to form an enamel that will bake in from nine to ten hours at a temperature of 160° Fahr. One day's work would then be ready the next morning for the next application, and a great deal of time could be saved. All of the different operations, viz., coloring, rubbing, varnishing and even finishing, could be carried out in this way, and the result would be a finish that would outwear work done by the present method of painting and f.n-

I do not mean to fit up an oven or a kiln, but to set apart a large room with ample floor space, entirely closed except for ventilating openings, so that as soon as an operation on the body is completed the body could be run into this room. At night the heat could be turned on to produce a temperature of 160° Fahr., and the next morning you would find your work ready to receive another coat, the coat applied the previous day having been baked hard and tough.

Some may object to the large amount of floor space required for the drying or baking room, but it must be remembered that where this process is applied the bodies need not be left standing idle for forty-eight hours for the varnish to dry (and in damp weather the different coats will not properly dry even in this time).

Where the baking process is to be applied an entirely different class of varnishes from those commonly employed must be used, varnishes especially made for the baking process. If any reader of THE HORSELESS Age is interested in the method I will try to answer any reasonable inquiry.

U-No.

# Formula for Steering Pin. Editor Horseless Age:

Please give formula for finding correct diameter of front axle spindle bolt for a four cylinder touring car of standard type. Weight of car empty, 2,800 pounds. Bolt will be made of machine steel, case hardened.

J. T.

[We have never seen a formula for the size of this pin, but we would go about its calculation in the following manner: From the section of the axle just outside the spring pad and the tensile strength of the material determine what force would be necessary, applied at the centre of the pivot pin, to bend the axle in a fore and aft direction. Then make the pin of a diameter so as to have a shearing strength equal to one-half this force, if the axle spindle is midway between the two shearing points. If the axle spindle is nearer to one of the shearing surfaces the diameter must be made slightly larger, as the strain is then not evenly divided between the two sections of the pin.—ED.]

# Where Autos Are Barred on Market Days.

Some American automobile tourists who recently made a tour to Nova Scotia had the misfortune to come in conflict with the local regulation which prohibits the driving of automobiles on public roads on market days. The tourists discovered, too late, unfortunately, that market days are not the same in the different towns, and while they steered clear of the market day regulation in one town they came in conflict with it in another.

Baron Boto, Japanese Minister of Communications, is looking into the advisability of introducing motor mail delivery in the principal cities of Japan, and also in some of the remote districts.

# GARAGE ITEMS



# Recording Garage Cash Sales.

By W. V. W.

Keeping track of the cash sales made on the floor or in the stockroom is one of the most difficult problems in the management of a large garage. Though most of the cash sales represent minor items, their aggregate will foot up a good sized total at the end of the month, and the fact that, as a rule, more than one person takes in the money for the cash sales leaves the door open to confusion, loss of money, of time and of customers.

Since the occupation of the establishment's new building the superintendent of the White Garage. Los Angeles, has introduced a system of recording cash sales that has given good results. Whether the item sold is gasoline, oil, labor or accessories, a duplicate bill is made out, one of which goes to the buyer and the other one to the bookkeeper. The bookkeeper's copy remains on a hook alongside of the desk or portable oil tank until evening. All the bills are numbered. Whenever a cash sale is made the man receiving the money records the amount on the cash register, at the same time writing the number of the bill. the amount taken in and his name on a pad provided for the purpose. On the cash register four buttons for four different classifications of the sales have been provided.

The buttons divide the cash record into four columns, headed "Garage," "Gasoline," "Oil" and "Stock." If gasoline is sold the foreman, after making out the bill, presses the button marked "Gasoline," and the amount of the sale and registers the transaction. The machine automatically records the sale in the "Gasoline" column. Other items are recorded similarly, thus making it possible at the end of the day to ascertain the amounts of cash received from the four classes of goods at a glance.

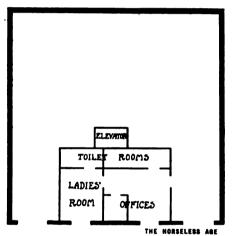
Under the head "Garage" the following items are entered: Washing and polishing, all garage labor, storage, carbide in less then 10 pound cans, changing casing or tube, towing, driving services and auto hire. The gasoline column includes distillate, and coal oil is classified under "Oil." "Stock" sales comprise carbide in 10 pound cans, grease, tires and other parts out of the stockroom.

In the stockroom a similar system has been introduced. The four classes registered separately on the cash register are repairs, white parts, local parts that are bought outside or made in the shop, and C. O. D. sales, though items in this last class are not added to the total of the other three.

For reference purposes the superintendent of the garage has started an alphabetical double index of owners' names and card numbers in order to facilitate the identification of cars by the names of the owners or by their numbers. Every car entering the garage is recorded on two separate cards. On one card the name of the owner appears, followed by his address and telephone number, with the number of his car on the other side of the card. The second card reverses the order of the entries, the car number coming first and the owner's name last. By reference to this double index the owner of a car of any number can be ascertained without loss of time, and with equal ease the name of the owner will disclose the number of his car.

### The Uptown Garage.

The building at 144 to 160 West Twenty-fourth street, New York city, is being entirely remodeled and will shortly be opened as the Uptown Garage. It is a five story and basement structure 100 feet square. There are two doors in the front, one near either end, to be used as entrance and exit respectively. Between these doors are the offices and ladies' waiting room, with toilet rooms in the rear. Lockers are provided in



FIRST FLOOR PLAN OF UPTOWN GARAGE.

the men's toilet room for those who drive their own cars. The elevator, which will take a car from the basement to the fifth floor in thirty seconds, and can be entered from either side, is located back of the offices in such a position that both in entering and leaving the car makes a turn of 90 degrees. The central position and double end feature of the elevator make turntables unnecessary.

On the second floor are the chauffeurs' rooms, with lockers, etc., and the fifth floor is to be a very complete machine shop, with facilities for making any repairs. The shop will be in charge of Mr. Egley, who has had seven years' experience in one of the repair shops in the city. The basement, first, second, third and fourth floors will be available for storage except for the offices, and five washstands will be provided, two on the main floor and one each in the basement and on the third and fourth floors. There are two gasoline tanks of 275 gallons capacity each, provided with Bowser pumps. G. M. Irwin is manager, J. C. Waterson president and J. W. Hatch vice president.

### The Belnord Garage.

A new garage is at present being erected at 260 West Eighty-seventh street, New York city, just west of Broadway. This is a residential section at the extreme north end of the automobile district. It is to be known as the Belnord Garage, and will care for gasoline pleasure cars exclusively. The front of the building measures 125 feet, and is of glass for the first and second floors. The building is 1081/2 feet deep, with two full floors and a third floor about 25 feet square. There are two entrances to the first floor, one near either end of the front, and the second floor is reached by an elevator situated at the centre of the front and entered from the street. The walls are of brick and the floors of concrete. The building will be supplied with electric light and steam heat. The central part of the front will be occupied by the offices, 30x20 feet, part of which will be fitted up as waiting room and part as private office.

A machine shop will be situated at the rear of the second floor, where skylights are provided. The shop will be 30x50 feet and will be provided with two pits and a complete set of machinery for doing all kinds of repair work. A stock room 35x60 feet will be in front of the machine shop. Practically all the rest of the first and second floors, or about 23,000 square feet, will be available for storage.

Two washstands will be provided on the first floor and three on the second. They will be of the revolving type with light in the top. Provision will be made for heating the washing water in winter. The third floor is to be devoted entirely to the chauffeurs' rooms, where billiard tables will be provided, as well as shower baths, lockers. etc. There will be five five-barrel gasoline tanks in the courtyard at the rear, provided with air pressure pumps. The gasoline will be taken to the cars in three portable tanks. The stock of oil will be kept in a small separate room on the first floor, where several grades will be carried. A compressed air plant will be provided and the air will be piped to all parts of the first and second floors, twelve outlets being provided for the inflation of tires. Exceptional precautions are to be taken against fire. The garage will be provided with automatic sprinklers, sand barrels and hand extinguishers, and it is planned to organize the force into a fire brigade and to have twenty hands in the building at all hours ready to answer the automatic alarm. The cars will be checked in and out, and a record will be kept to guard against unauthorized use of cars by the chauffeurs.

# Maintenance Under Contract.

The Cordner Motor Car Company, of 1540 Broadway, New York, who have the metropolitan agency for Acme cars, have been conducting a maintenance service since early in the year, by which owners of their cars are relieved of all worry and trouble incidental to the care and repair of the car, at a cost which, it is believed, is less than

the expense which would be incurred if the owner were to give the matter his personal attention. For the sum of \$200 per month the Cordner Motor Car Company agree to store and care for the car for the period of one year, furnishing a chauffeur, tires, gasoline, oil and other incidentals, executing all necessary repairs, replacing any parts which may fail, and, in short, fully assuming the maintenance of the car, so that all the owner has to do is to order the car sent around when he desires to use it. Credit is given for supplies purchased on short trips, such as the week end outing, but when an extended tour is made the time during which the car is away is deducted from the maintenance period. Damage to the car, due to accidents or ill usage on the part of the owner, is made good at his expense.

To secure this rate a contract must be entered into for a year's maintenance, and the rate is based upon an assumed travel of 1,000 miles per month. If the actual mileage is less the customer is credited with 10 cents per mile for the difference, and if the mileage exceeds this figure he is charged 10 cents per mile for the excess mileage.

The chauffeur is hired by the Cordner Motor Car Company, but is subject to the owner's orders when the car is in service. So far, this divided responsibility of the driver has not led to any trouble.

At the expiration of the year's contract, and before another contract will be signed by the company, the car must be given a thorough overhauling, the labor cost of which the owner must pay, but any new parts necessary through defect are supplied at the expense of the makers of the car.

# New Building for Seattle Winton Branch.

Quite an imposing building is at present being erected by the Winton Motor Carriage Company for its Northwestern branch in Seattle, Wash. It is a six story, basement and sub-basement structure, fronting 80 feet on Pike street and 110 feet on Terry avenue, and will call for an investment of \$150,000 it is said. The building is expected to be ready for occupancy about December 1, and immediately upon its completion the Winton branch will be removed from its present location at 715 East Pine street and occupy the entire building.

The plans for the new building are the work of Geo. W. Miller, manager of the Northwestern branch. They embody a number of novel features in garage construction. The roof of the building, which has a surface area of 8,800 square feet, will be used for testing purposes, which arrangement offers the advantage over an indoor testing room that no annoyance will be caused by the exhaust gases and the noise. In the centre of the building there will be a spacious court, which will permit of easy manœuvring of the cars. The garage space will be divided up according to the separate stall plan, and as soon as an owner ar-

rives with his car it will be received by a foreman, who will place it in its stall. Large lockers are provided for the convenience of patrons, and for the use of owners who drive their own cars there will be a special department where they can make their own adjustments and repairs without being disturbed. The building also will contain a very completely equipped machine shop and a stockroom in which renewal parts of all kinds will constantly be kept on hand.

The main floor will contain the executive offices and salesroom. On the upper floors there will be an upholstering department and a paint shop. Among other features of the new garage building is a clubroom for chauffeurs, which will be equipped with billiard and pool tables and a supply of trade papers, where chauffeurs can spend their leisure hours while waiting for orders from their employers. A private branch telephone system will be installed, connecting all the different departments with the main office. Up to now most of the salesrooms and garages in the Northwest have been housed in old buildings not specially adapted for the purpose, and the new Winton garage marks probably the first step toward the erection of a series of buildings specially for the automobile trade.

# Garage Fires.

The garage of the Robbins Auto Company at Owosso, Mich., was nearly destroyed by fire on the night of August 23. The blaze spread so rapidly that there was not time to remove all the autos and several were badly damaged. The loss on the building is estimated at \$10,000.

A blaze was started in the Burker garage in Racine, Wis., on August 23, owing to gasoline accumulated in the drip pan underneath the machinery of a car becoming ignited in some way. The flames spread rapidly, but the car was promptly pushed out into the street where the fire was extinguished with sand.

# Hoyt Instrument Company to Build Salesroom and Garage.

The Hoyt Electrical Instrument Works have bought a piece of land fronting 100 feet on Main street, Penacook, N. H., which forms part of the Central Trunk Boulevard being built through the White Mountains. The company will erect a modern fireproof garage and salesroom on the plot. The Washington street plant will in future be devoted exclusively to the manufacture of Hoyt meters.

# Take Up Manufacture of Auto Bodies.

The Kahler Company, of New Albany, Ind., have taken up the manufacture of special automobile bodies, that is, bodies built to suit the requirements of automobile manufacturers. They have just completed a new and modern plant, with electric power. The new plant is so situated as to enable it to ship its products by four railroads.

# Swinehart Company to Manufacture Pneumatics.

The Swinehart Clincher Tire and Rubber Company, of Akron, Ohio, are planning to embark in the manufacture of pneumatic tires and to carry on a more extensive selling campaign in the future. The company have recently sold the remainder of their treasury stock, and will immediately proceed to improve their equipment and enlarge their capacity. A pneumatic tire is at present being developed, and an improvement in the company's solid tire for commercial vehicles is being tested out. At the annual meeting of the company, held on August 23, the following officers were elected: J. A. Swinehart, president; W. W. Wuchter, vice president and general manager; C. O. Baughman, secretary, and R. A. May, treasurer. President J. A. Swinehart will start on a European trip about October I, with the object of establishing a European branch. Mr. Wuchter, who has been general superintendent of the Firestone Tire and Rubber Company for the past five years, will assume the active management of the company's affairs.

# Studebaker Business in Colorado Incorporated.

The Studebaker interests in Colorado have been incorporated with a capital stock of \$100,000 under the name of the Studebaker Colorado Vehicle Company. The company owns a repository for carriages and wagons at Fifteenth and Blake streets and a garage and automobile repository at 1532-38 Broadway, Denver. The officers of the company are: Frank S. Fish, South Bend, Ind.; W. S. Hunnewell, Denver, vice president, general manager and treasurer, and Elias K. Pound, Denver, secretary. The management of the Denver stores will continue in the hands of W. S. Hunnewell, who has been at the head of the business for four years.

# Mason Automobile Company to Remove to Waterloo.

It has finally been decided to remove the business of the Mason Automobile Company from Des Moines to Waterloo, Ia. The capital stock of the company will be increased to \$1,000,000, and the car will hereafter be known as the Maytag-Mason car. The company has bought the plant of the Waterloo Motor Works, formerly owned by the Cascaden Manufacturing Company, which was specially erected for automobile construction. The company expect to move into this factory on October 1, and to be in full operation within thirty days. In addition to this building they will immediately erect a three story glass and concrete building, 100x200 feet, and a special office building opposite the present factory building. It is planned to continue the manufacture of the company's double cylinder opposed 5x5 inch car, and to turn out 2,500 of this type in 1910.

# Commercial Applications.



# The Taxicab Business in Kansas City, Mo.

By J. W. Morrison.

The taxicab business is of such recent origin in Kansas City that it may truly be classed as an infant industry. The pioneers in the enterprise here were two young men, who bought one taxicab last winter and operated it in a free lance style in the hotel and business district. Their enterprise proved so profitable that it was not long before rivals entered their virgin field, and there are now two regularly formed companies competing for the business.

The larger of these two concerns is the Standard Taxicab Company, which was organized April 15 last. This concern has offices at 1329 Walnut street, which is close to the business centre of the city. The other concern, the Balch Taxicab Company, has its place of business at 1912 East Thirteenth street, well out into the residential district.

The Standard Taxicab Company operates two makes of cabs, viz., Thomas and Carter. The company is at present operating twelve machines, six of each make. This number is not sufficient to fill the rapidly growing demand for taxicab transportation, however, and the company now has orders placed for twenty-five more machines, which are to be delivered as rapidly as the manufacturers can supply them.

The Standard Company maintains two public stands, one at the Sexton and one at the Savoy Hotel, and also one private stand. By far the greater part of the firm's business, however, is through calls for service turned in over the telephone at the company's main office.

All the cars in Kansas City use pneumatic tires. The Standard Company uses Goodrich quick detachable tires. No extra wheels are carried by its cars. The company has two systems of charging, one by the hour and the other by the meter. The rate by meter for one or two passengers is 40 cents a mile. Waiting time is charged for at \$1 per hour. On week days all charges are made according to the meter, but on Sundays there is an extra number of calls for rides over the boulevard system, and then the cabs are rented out by the hour. The rate is \$2 an hour if only one or two passengers are carried, and \$3 an hour when more than two are carried.

All the taxicabs used here have the meters attached to the front wheels. The Standard Taxicab Company makes its repairs in its own shops, but has a maintenance contract with the tire makers. The records of the Standard Taxicab Company show that its cars make a daily average of about. 25. Frequently some of the cars

have more than 30 miles to their credit. The operators are paid a regular salary.

CLASSES OF PATRONS.

The records of the Standard Company show that the calls for service can be divided into three general classes-social calls, that is, calls from persons who wish to go to balls, receptions or theatres, or to fill dinner engagements. This is by no means a small part of the business, and is one that is catered to, as it is profitable and easy work for both the cabs and the operators. Next come the depot calls. These are both from the hotels and from private residences, and are from persons who usually are in a hurry to catch a train and are anxious to make good time. Right here it may be mentioned that Kansas City has, as yet, no police regulations leveled directly at the taxicab as such, and the operation of the cabs is controlled solely by the regular motor car regulations. The third class of patronage is from the men about town in search of amusement; in other words, from the "joy riders." This class of business comes almost entirely after the shades of night have fallen, and the owners of taxicabs gain no small pecuniary profit from those who like to 'hit it up a little" while the rest of the town is

#### SIGHTSEEING TRIPS.

There is one source of business for taxicabs in Kansas City that probably is not available in all other cities, and that is the park and boulevard system. Kansas City has miles and miles of boulevards, all of them connecting and leading to natural parks. These boulevards, paved with macadam and rendered absolutely dustless by applications of crude oil, make a paradise for motorists. The man who doesn't own a car takes advantage of the fine motoring by hiring an automobile or a taxicab, and this class of business keeps the taxicabs busy from morning till night every Sunday. Much of this business, of course, is from strangers in the city. The manager of the Standard Company says that an astonishing number of visitors in the city have heard of the fame of Cliff drive, a boulevard that has been cut out of the side of a high bluff overlooking the Missouri River, and ask to be taken over it. This particular drive is several miles from the depot and hotel district, and is itself 3 miles long, so that it will be seen that boulevards are a good asset to the taxicab man when it comes to registering profits on the cab's meter.

In this connection it may not be amiss to say, however, that Kansas City is an expensive town in which to run a taxicab or any other kind of a motor car, because it is a city of hills. In fact, there is scarcely a moment when you are not going either up or down, which means that if the motor is not doing its best the brakes probably are working overtime. So hilly is it that the manager of the Thomas Company, when he came here to install the Thomas taxicabs, said it was the hardest city he ever saw to operate a taxicab in.

DIFFICULT TOPOGRAPHICAL CONDITIONS.

The difficulties presented by Kansas City's topography are so numerous that when autombiles first came into use in the East it was freely predicted that they would never be seen on the streets of Kansas City, because they would not be able to negotiate the grades. However, since those prophecies were made Kansas City has grown into one of the largest distributing points in the country for motor cars.

The Balch Taxicab Company, the other concern here, operates two taxicabs of Overland make. This company devotes itself entirely to answering calls for social purposes, and finds that it is kept busy by that line of patronage. The Standard Company intends to invade the residential district soon, and for this purpose will establish a garage on one of the boulevards in the southern part of the city, probably about Linwood boulevard and Troost avenue. This will enable the company to respond to residence district calls without the loss of time involved in sending a cab clear from the business centre of the city.

### The Taxicab Situation in St. Louis.

The taxicab business in St. Louis, Mo. is practically controlled by one company, the St. Louis Taxicab Company, which maintains an office at 5011 Delmar avenue. and a garage and repair shop at 1622 Morgan street. This concern entered the taxicab field in March of this year with one Atlas cab, and has gradually increased its stock until now it has fifteen Atlas cars in commission. The management states, moreover, that it expects to continue to increase until it has 100 cars in service, and that it is its intention to have fifty cars in service by the first of the year.

Although St. Louis never was much of a cab riding city, when the taximeter cabs were placed in service there arose immediately a constant demand for this type of transportation. Persons who never used horse drawn cabs are now regular patrons of the taxicab. Stands are maintained at the following hotels and clubs: Maryland, Southern, American, Jefferson, Marquette and Planters hotels, and Missouri Athletic and St. Louis clubs. At present the company can keep only one or two cars on any of the stands at one time, but as they increase the number of cars in service more cars will be placed on the various stands. No special charges for licenses are made by the city for the operation of the cabs, the latter being licensed the same as any touring car owned by an individual. The Franco-American taximeter is used, and is attached to one of the front wheels. Diamond quick detachable rims are fitted to all cars, and no extra tires are carried. Drivers are hired on a straight salary basis. The average daily mileage of the cars is about 50. All repairs are made in the company's own shop, where several expert machinists are employed. The rates are so cents for the first mile and 10 cents per each additional quarter mile for one or two passengers. For three or four passengers a charge of 70 cents is made for the first mile and 15 cents for each additional quarter mile. These rates are somewhat higher than the rates charged in Eastern cities. Ten cents is charged for each six minutes of waiting, and a flat rate of \$4 an hour is made if desired.

In addition to the cars operated by this company there are probably seven or eight touring cars, with taximeters attached, owned by individuals, for rent, and also four other taxicabs in the city. The individual car owners charge the same fares as the company.

#### Automobile on Railroad Tracks.

To reduce the cost of carrying passengers over a standard gauge branch railroad built for the purpose of carrying coal from a mine in the Coast range of California, a six cylinder touring car, equipped with six flanged wheels, is to take the place of the locomotive and passenger coach. The automobile, a Premier, has been fitted with the flanged wheels and the extra pair in front in a Los Angeles garage. Trial trips over an experimental track have given satisfactory results, but only actual use can demonstrate the practicability of the scheme on the grades and curves of the mountain road.

The automobile is to run over a branch line starting at Chanslor, on the Coast line of the Southern Pacific, and ending at the mines of Stone Canyon, 22 miles distant in the hills of the Coast range. Both settlements are in their infancy, and passenger traffic is light. In order to make possible faster and more frequent service at reduced cost Walter Chanslor, the founder of the town bearing his name, and member of a Los Angeles automobile firm, conceived the idea of changing a touring car into a self propelling passenger coach.

# Another New York Suburban Express Service.

• A single 3-ton gasoline motor truck is being run on general express business between New York city and Newark, N. J.. by the Duckworth-Crawford Express Company, 218 Duane street, New York. Two trips are made daily, and when the truck is out of commission or when there is too much freight for it to handle, horse-drawn trucks are hired to help out. The rates charged for freight between New York and Newark are 25 cents per 100 pounds. The service has been in operation only about eight months, and we are unable to get any data on cost of operation.

### Commercial Notes.

A company is being organized at Fremont, Ohio, to establish an automobile service between Fremont and Greenspring.

The City Council of Pasadena, Cal., has purchased two runabouts, at \$500 and \$600, respectively, for the use of the street superintendent and the city engineer. The

cars were bought from the Hanson & Whitman Company, a local concern, and are guaranteed for one year.

Harry E. Pence, of Minneapolis, Minn., who planned to establish a taxicab service in that city, announces that he abandoned the project because of the speed limit of 15 m. p. h. on parkways.

The Autocar Company have just delivered ten new Type 18 taxicabs to the Pennsylvania Taxicab Company, and have also received an order for additional cabs from the Taxicab Company of Baltimore.

The Maxwell-Briscoe Company, of Philadelphia, have just started six model H taxicabs equipped with 30x4 Ajax tires. Rates are standard for the city. Manager Roberts states that additional cabs will be put on soon.

The Automobile Transit Company, which conducts an automobile service between Reading and Bernville, Pa., has recently put in service a new 80 horse power, twenty passenger car, which covers the distance of 13½ miles in a little over an hour.

W. A. Quillin, a former livery man of Russellville, Ala., plans to establish an automobile line between Russellville and Tuscumbia, a distance of 18 miles. Mr. Quillin intends to purchase several touring cars and make two round trips per day.

The Seattle (Wash.) Taxicab Company now has thirty-five taxicabs in service, which are being much used, particularly by visitors to the A. Y. P. Exhibition. The minimum fare is 30 cents for a half mile, which is less than is charged in most other Western cities.

Gen. Ernest Coldwell and S. P. Kirkpatrick are organizing a company in Shelbyville, Tenn., for establishing an automobile service between Shelbyville and Fayetteville, by way of Lynchburg. Two cars will be placed in service, so constructed as to permit of carrying both passengers and freight.

Having experimented successfully with trucks of smaller capacity, the Polk Milk Company, Indianapolis, has purchased a 4 ton gasoline truck, which it will place in country service, collecting milk. The company expects to cover a route of 75 miles daily, between Indianapolis and Greenwood, Mooresville and Plainfield.

Several automobiles are to be used in connection with the new R. F. D. route out of Pullman, Wash. The rural route as established leaves Pullman on the Wawawai road and runs to Ontario, thence to the Ryan farm, up Union flat and return to Pullman from the south. The route will be 25 miles in length,

The services of the Pioneer Motor Company, between Marquette and Ishpeming, Negaunee and Presque Isle, Mich., are reported to have proven quite successful. Up to August 20 the cars of the company had carried 9,721 cash fare passengers, exclusive of 700 persons who made up charter parties, which chartered the cars at a flat rate. So far there has not been a single accident on the routes.

#### More Favorable Freight Rates.

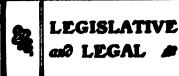
After October 1 shipments of single automobiles will be charged for by the railroads on an actual weight basis instead of on the basis of fixed minimum weights. Heretofore the railroads have charged 8,000 pounds at first class freight rate for any passenger machine with wheel base exceeding 86 inches. As many, and perhaps most, of the low priced machines nowadays have a wheel base exceeding 86 inches, there has been much complaint against this charge. The advantage claimed for the new arrangement is that it insures a more equitable distribution of the transportation charges, so that the smaller machines will hereafter be taken at the equivalent of 5,000 pounds at first class, and the charges increased only as the weight, size and value increases, the point being made that automobiles are of substantial and varying weights. A similar change will be made on shipments boxed or crated, on which the actual weight will apply, instead of the fixed minimum weights heretofore applied according to the size of the packages. The new classification affects shipments originating in the Northern States east of the Mississippi River, thereby including practically the entire manufacturing

A similar arrangement was made with Western and Southern railroads some time ago.

The automobile industry is represented in such matters by the general traffic department of the National Association of Automobile Manufacturers, Inc., and by arrangement between the associations, the general traffic department also represents the Association of Licensed Automobile Manufacturers and the American Motor Car Manufacturers' Association, with J. S. Marvin as general traffic manager, factory traffic managers co-operating under this plan on matters of general interest. This department is in touch at all times with the transportation charges on automobiles and parts throughout the country, Mr. Marvin attending meetings of railroad rate committees at various points.

# Schedules of Twentieth Century Manufacturing Company.

Schedules in bankruptcy of the Twentieth Century Manufacturing Company, bicycles and auto lamps, of 19 Warren street, New York, show liabilities of \$63,201 and nominal assets of \$23,837, consisting of stock, \$6,000; machinery and fixtures, \$1,000; motor boat, \$1,000; accounts, \$13,211; cash, \$2,-626, and twelve patents pledged to the Scoville Manufacturing Company, of Waterbury, Conn., a creditor for \$9,676. Among the creditors are George B. Wilson, Philadelphia, \$22,762; Merchants' Exchange National Bank, \$11.400; Leo Popper & Son, \$1,488; Manhattan Brass Company, \$845, and W. B. Bertels, Son & Co., Wilkes-Barre, Pa., \$800. The company owes \$670 for business taxes in New York and New Jersey.



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### Parcels Post and Motor Mail Delivery.

Another bill designed to establish a parcels post has recently been introduced in Congress and will probably be taken up at the next session. It is known as House Bill No. 10,762, and was introduced by Hon. William S. Bennett, of New York, June 17. This bill provides:

First, for a general merchandise service in unscaled parcels at a cent per a ounces, the old merchandise rate of 1874.

Second, for a local unsealed parcels service at a cents for 4 ounces, z cent each additional 2 ounces—the general sealed parcel or letter rate of Great Britain.

Third, for a local service on the rural routes all mail matter in one class, with rates as follows: Parcels up to 1x6x12 inches, one-twenty-fourth of a cubic foot in bulk, and up to 1 pound in weight, 1 cent.

Larger parcels up to 6x12x12 inches, one-half the ordinary suit case or to one-half a cubic foot in bulk and up to 11 pounds in weight, 5 cents.

Larger parcels up to 6x12x24 inches, or to the size of the ordinary suit case or 1 cubic foot in bulk and up to 25 pounds in weight, 10 cents.

Fourth, for the insurance of all mail matter-

Pourth, for the insurance of all mail matter the ordinary rates to carry insurance up to \$10; the \$ cent registration fee to insure up to \$25; 2 cents additional for each additional \$50 to insure up to the full value of the parcel.

It seems to us that the plan to establish a parcels post deserves the support of automobile interests. If a low rate is made on parcels it is to be expected that an enormous business will develop in a few years. The delivery of the parcels by letter carriers on foot would be out of the question, and the introduction of motor mail and parcel delivery would be practically assured. This would create an enormous market for cars-a steady, permanent market, as the rural free delivery service is rapidly expanding. This, however, would not be the only benefit which a parcels post would confer on the auto industry. In order to insure the prompt delivery of parcels in the country the year around it would be necessary to build improved highways, and as it is the farming population that is most interested in the parcels post, the establishment of this service would tend to bring the farmers in line for good roads. At present the cry is often raised in the country that good roads benefit no one but the automobilist. It is quite conceivable that when daily mail delivery by automobile to every farmer's door becomes a reality this cry will cease.

### Senator Alids Promises New Auto Bill.

Senator J. P. Allds, of New York, whose automobile bill introduced in the last Legislature was vetoed by Governor Hughes, announces that he will introduce another bill at the coming session which not only will cover the taxation of automobiles, but

also impose proper limitations on the operation of the vehicles for the protection of the public. Mr. Allds asserts that the public has a right to demand that all persons in charge of automobiles shall be competent, from the mechanical standpoint, to drive the machines, and also be mentally competent to be in charge. Senator Allds states that chauffeurs should be licensed, and that in case of an offense against the law the magistrate should make an indorsement on the face of the license. If a man is proven to be wilfully negligent or persistently careless, his license should be revoked.

### A Decision Regarding the Scope of Automobile Guarantees.

George A. Joslyn, an Omaha, Neb., newspaper man, some time ago brought suit against the Cadillac Automobile Company to recover \$3,217.87, paid for a car of the company, and \$66.50 paid for freight charges, because the car delivered to him would not climb the Farnam street hill, so Joslyn alleged. The Circuit Court at Detroit, after hearing the case decided that, since the company did not specifically guarantee the car to climb this particular hill, the complainant was not entitled to damages. Joslyn has now appealed to the United States Circuit Court of Appeals.

# Coroner's Finding in Indianapolis Fatalities.

Coroner Blackwell, of Indianapolis, upon concluding his inquest into the deaths of William Bourque and Harry Holcomb, driver and mechanic, respectively, of the Knox car that was wrecked in the races on the Indianapolis Speedway, on August 19, holds the officials of the Speedway responsible and recommends an investigation by a grand jury. The coroner says that the fatality was due to the car striking an open ditch, near the edge of the track, which was 20 inches wide and 2 feet deep. He also calls attention to the fact that the management of the Speedway had an ambulance force on hand, from which he concludes that they expected an accident.

#### Garage Restrictions in Washington.

Acting Engineer Commissioner Kelly, of the District of Columbia, has made an amendment to the building regulations of the District, prohibiting the establishment of a public garage without the consent of 75 per cent. of the property owners within 200 feet of the proposed structure if on a residence street, or without the consent of two-thirds of the property owners within 90 feet if on a business street adjoining at the rear residential property or a public alley.

#### After Indianapolis Joy Riders.

The board of public safety and Judge Whallon, of the Police Court in Indianapolis, have collaborated in a plan to stop joy rides and unusual violations of the motor laws. Last week Judge Whallon fined Dolph Staub, a driver for E. L.

Patrick, \$180 and costs and sentenced his to therety days' imprisonment for malicing trespass, and also fined him \$10 and cost for violating the speed laws. The saley board has announced under a new ordinance it will not permit the registration of driven who have been given workhouse sentences. Staub wrecked his employer's machine when he took a number of friends riding.

#### Joy Riding Now Larceny in New York.

Section 1239a of the Revised Statuss of New York State, which went into effect September 1, makes joy riding a larceny, providing that those who borrow annon-biles without the authority of their owner have stolen them and are liable to punishment accordingly. By another amendment to the automobile law a person who with intent damages an automobile or other motor vehicle is declared to be guilty of a misdemeanor.

### Jeffery Will Fight Oil Inspection Law.

Thomas B. Jeffery & Co., of Kenosha. Wis., one of the largest automobile mamfacturing concerns in the West, will test the constitutionality of the oil inspection law passed at the last session of the Wisconsin Legislature. The company has refused to pay a bill of \$7.60 from H. E. Grace, deputy oil inspector, for inspecting 76 barrels of gasoline.

# Officials Ignorant of Law, Release Offender.

Postmaster W. L. Irvine, of Harpers Ferry, W. Va., was arrested at Chambersburg, Pa., for not having a Pennsylvania State license tag number on his automobile. Mr. Irvine contended that under a new law a person can ride for ten days in Pennsylvania without a license. As the officials were unable at the time to get hold of a copy of the law they released him. Afterward they discovered that the law does not go into effect until January 1, and then only with States that reciprocate. Non-residents driving in Pennsylvania this year must take out licenses, the same as before the new law was passed.

#### Legal Notes.

An ordinance to provide and compel the use of mufflers on automobiles excepting when the machine is developing full power to climb a hill has been introduced in the common council of Beloit. Wis.

The police of Kenosha, Wis., have been instructed to arrest all automobilists who exceed the speed limit on the main thoroughfares of the city. There have been few prosecutions for speeding this year.

City Commissioner W. J. Kohlhauff, of Houston. Tex., plans to introduce an ordinance in the City Council to regulate the conduct of automobile garages. A similar ordinance was recently adopted in San Antonio, which seems to have suggested the idea to Commissioner Kohlhauff.

# OUR FOREIGN EXCHANGES



### The Tire Business in Germany.

A recent article in the Gummi-Zeitung throws a number of interesting sidelights on practices in the German automobile tire business. A translation of the article is as follows:

The rising price of crude rubber compelled our industry to raise prices, beginning in the usual manner with mechanical rubber goods. In the camp of tire manufacturers it is, however, as yet rather quiet, and it is a matter for surprise that the tire prices were not raised first, as much greater quantities of rubber are consumed in their manufacture. The chief reason is that in many cases bicycle tires and automobile tires of both the pneumatic and solid variety are delivered under contract, in which case a price increase is impossible. Such contracts are made by dealers, either jobbers or garage owners, chiefly to secure the lowest-possible prices, and it is the custom to specify a number of tires which is to be taken in one year, but which generally is not taken. "Accommodation" has been a very familiar term and is constantly asked for by the dealers. As early as July and August, when business begins to get slack, the tire manufacturers begin to make contracts for the coming season. although oftentimes not even one-half of the tires contracted for the previous year have been taken. Here, again, "accommodation' becomes a factor, as the unfulfilled portion of the contract is either cancelled entirely or is included in the next year's contract. Even if a manufacturer proceeds in a proper manner and insists upon the delivery of the entire number of tires contracted for, he will not meet with success, for the dealer will always urge various excuses which to him seem sufficient to relieve him of his responsibility as regards carrying out the full contract.

Instead of doing business on a business basis, the manufacturers, unfortunately, are introducing the most varied practices, and grant favors whose detrimental influences in dealers' circles are clearly discernible when new contracts are closed. It has also become quite customary, even when no more than 100 sets of tires are contracted for, to brand them with any special fantastic trademark, instead of the regular factory mark. In this connection names are often selected which might be looked for anywhere else except on pneumatic tires. It is not impossible that during the coming summer Zeppelins will not only navigate the ethereal blue but will also ride the dusty road as Zeppelin tires, provided the owner of the name does not forbid the nuisance. It will be interesting to note how tire prices will vary during the coming summer in view of the present high

prices of crude rubber. Perhaps the present situation will result in an attempt being made to prevent such unnatural price fluctuation in the crude rubber market in the future.

A definite time guarantee is but rarely given on automobile tires, but the kilometer guarantee according to which the purchaser is made a certain allowance proportional to the difference in mileage guaranteed and actually obtained, which has long been customary in the solid rubber tire business, is also slowly being introduced in connection with pneumatics. The guarantee begins on the day of sale and covers a certain number of kilometers, generally either 5,000 or 6,000 kilometers for pneumatic tires and 15,000 kilometers for solid rubber tires, which must be covered in a single year. The manufacturer guarantees the tires to be free from defects and to be durable in case of reasonable use. Damage to the tires due to driving on newly surfaced roads is not covered by the guarantee. As soon as the tire develops a defect covered by the guarantee it is replaced by the manufacturer, the customer paying for the service he received from the defective tire.

It is, of course, a very difficult matter to keep track of the mileage of the tires, and, especially in the case of motor trucks, of the loads carried, and these matters often lead to disputes. The motor trucks of breweries are often overloaded, which is very hard on the tires and causes them to wear out prematurely. There is little complaint about solid rubber tires from omnibus companies, whose vehicles run principally on smooth asphalt pavements in the city, and for this reason the tires are naturally much longer lived. But in the case of these companies the operation of the vehicles is under constant supervision, which is not the case with the omnibuses.

German solid rubber tires have in recent years found quite a market in England, being sold, generally, on a mileage basis, and English customers are in the habit of placing contracts at fixed prices for years. Many rubber factories will undoubtedly suffer under these contracts with the present high prices of crude rubber.

# Status of the Austrian Automobile Industry.

A report concerning the condition of the Austrian automobile industry during the past year was recently presented to the Minister of Commerce by the Chamber of Commerce. It is pointed out in the report that the new motorist liability law had a strong influence on the business during the year. The ominous expectations attached to the new law deterred the public from purchasing automobiles. A change in this respect took place only toward the end of the year, after the automobile club had succeeded in making it possible for automobile owners to insure themselves

against liability at relatively low premiums. The demand for automobiles in Austria was still largely met by foreign firms. The overproduction in this line of industry in general had its depressing effect on the home market, as the foreign manufacturers, in order to accelerate business, quoted prices which were lower than the cost of production at the best home factories. The protection afforded by the tariff must be considered entirely insufficient. Of the new firms established in Austria during the last two years two have already disappeared, partly on account of insufficient sales and partly on account of unsoundness in the corporations themselves, which even at the time of organization did not promise continued success. In spite of the financially rather gloomy general view, it must, however, not be lost sight of that the Austrian industry is gaining in strength, especially in a moral sense, as home buyers are slowly recognizing the fact that Austrian automobiles are equal to foreign machines, and are also learning to appreciate the advantages arising from direct relations with home manufacturers in respect to fulfillment of guarantees, delivery of spare parts, repairs, There have been no revolutionary technical innovations during the year, which is undoubtedly to the advantage of the industry, and the efforts of the designers have been concentrated on the perfection of all parts so as to insure the greatest possible reliability, which is naturally a chief requirement of the buyer.

The suggestion has been made to exclude horse traffic from a large portion of the city of Westminster, England, on one Sunday late in the summer or early in the autumn, so as to give a demonstration of the advantages enjoyed by a horseless city.

A recent incident illustrates the important position which the automobile industry now occupies in the manufacturing world. A party wishing to contract for the production of a considerable number of special machines was unsuccessful in placing the order in either Chicago, Milwaukee or Cleveland, every shop of proper capacity to do his work being so busy on automobile work that it could not accept another contract for some time to come.

The Second International Good Roads Congress is to be opened at Brussels, Belgium, on July 31, 1910. The program of the individual sections has been laid down as follows: Section I.—Construction and maintenance of roads; erection of road signs; methods of dust treatment; completion of road systems; construction of local railways, etc. Also the care of streets in large cities, street cleaning, sprinkling and use of motor street rollers; removal of snow and ice, etc. Section 2.—Street traffic; influence of the weight and speed of vehicles; conditions which must be fulfilled by different types of vehicles, etc.

# The Brighton Beach Twenty-four Hour Race.

The second twenty-four hour race meet of the season was held at the Brighton Beach "motordrome," Long Island, on Friday and Saturday of last week. The event was won by a Renault car driven by Basle, who covered 1,050 miles, which is 127 miles less than the record made by Robertson on the same track last year. Second place was secured by the Rainier, driven by Disbrow, with 938 miles, and third by the Acme, driven by Patschke, with 883 miles. There were ten starters, as follows:

Car.	Drivers.		
ı-Renault	Basle and Raffalovich.		
2-P. & S	Lescault and Howard.		
3—Acme	Patchke and Maynard.		
4-Acme	Vantine and Koyouh.		
5-Lozier	Heina and Cobe.		
6-Stearns	Grosse and Mulford.		
7-Houpt	Robertson and Poole.		
8-A. & K	Hughes and La'well.		
9-Fiat	De Palmer and Parker.		
10-Rainier	Disbrow and Lund.		

The meeting was marred by numerous accidents, ascribed by some to the condition of the track. The twenty-four hour event began at 10 o'clock Friday night. Shortly, after 11 o'clock there was a collision between the Stearns car and Acme No. 3. The Stearns car struck the Acme, snapped its axle and turned over twice. The Stearns mechanic, Leonard Cole, met almost instant death, while the driver of the car, Laurenti Grosse, received injuries from which he died in the hospital the following day. The Allen-Kingston car, while driven by Hugh Hughes, had a collision with another car, whereby its gasoline tank was damaged and the gasoline spilled and set on fire, and Hughes was severely burned about the head. The Lozier, driven by Heins, crashed through the fence twice during the meet. The first time it turned over, but the driver and mechanic miraculously escaped unhurt, and after a delay of three hours continued the race. The second time the car went through the fence it turned over twice and was completely demolished, but the occupants again escaped serious harm.

Between 4 and 5 o'clock on Saturday morning a special policeman named Corrigan was badly injured through the overturning of a metal lamppost, which was knocked over by one of the racing automobiles, which skidded while going at top speed. Corrigan's leg was broken and his left knee dislocated.

The twenty-four hour event was preceded by a speed carnival, which included a one hour scratch motorcycle race, a six hour race for small cars, a 5 mile free for all and several exhibition runs. A note of discord occurred during the six hour race for small cars, in which two S. P. O. cars, a Hupmobile, a Mitchell and an Allen-Kingston competed. One of the S. P. O. cars, which was in the lead at the time, was disqualified for crowding the Hupmobile at the turns. The summaries follow:

One Hour Scratch Motor Cycle Race—Won by Indian (Walter Gorke); distance, 55¼ miles. Six Hour Race, Open to Stock Cars Costing \$2,500 or Less—Won by Hupmobile (Fred Woltmann); distance, 226 miles.

Five Mile Free for All—Won by Fiat Cyclone (De Palma); time, 5:14,3.5.

### Anti-Racing Movement Launched.

Lieutenant Governor Frank J. Hall, of Indiana, is reported to favor a special session of the Legislature to prohibit auto racing in the State. He is quoted as saying:

"They talk about bull fights in Mexico, but did you ever hear of several people being killed at a bull fight, and yet right here in Indiana great crowds go out to witness an event in which it may be expected that human life may be sacrificed. The Governor would be justified in calling a special session of the Legislature to pass a law prohibiting automobile racing under conditions similar to those of last week."

The Cincinnati A. C. has adopted resolutions condemning the recent automobile races at Indianapolis as hazardous and detrimental to the automobile movement. The resolution was adopted unanimously at a special meeting held August 26. It was also announced that it was the sense of the meeting that all members refrain from entering races, especially those similar to the Indianapolis event. The members present went on record as opposed to such races and agreed not to participate in them. Copies of the resolution adopted will be sent to all automobile clubs in the country, and their support of the movement thus started will be solicited.

It is reported from Dayton, Ohio, that the Dayton Motor Car Company have come to the conclusion that automobile racing is detrimental to the commercial interests of the industry, and the company will no longer participate in races. This conclusion was reached as a result of the fatalities at the recent Indianapolis race meet, which was attended by many employees of the firm.

### Sounding Makers Regarding Vanderbilt Cup Race.

H. E. Coffin, chairman of the general rules committee of the Manufacturers' Contest Association, has notified the prominent makers of the country that a race for the Vanderbilt Cup will be held late in October if a certain number of entries are pledged on or before September 1. If the makers guarantee the minimum number of entries required the race will be conducted by a new association formed pursuant to the A. C. A.-A. A. A. peace agreement, which association will assume the custody of both the Vanderbilt Cup and the Grand Prize Cup. By a change in the deed of gift the Vanderbilt Cup will become one for stock chassis competition under piston displacement classifications recommended by the Manufacturers' Contest Association, as follows:

I. The Vanderbilt Cup Race shall be open to cars of Sub-Classes I (45I to 600 cubic inches piston displacement) and 2 (30I to 450 cubic inches piston displacement) in

Class B, under the classifications of the A. A. A. racing rules for 1909.

2. A cup will be offered for Class 3 (231 to 300 cubic inches piston displacement), and another for Class 4 (161 to 230 cubic inches piston displacement) under the same classifications, these races to be run at the same time and on the same course, but for shorter distances.

If the Vanderbilt Race is held it will be run over the part of the Long Island Motor Parkway used in the cup event of 1908, with probably the same county and town roads. The race, if held, will be under the sanction of the A. A. A.

# Motor Cups Holding Company Formed.

Pursuant to the peace agreement between the A. C. A. and A. A. A. reached about a year ago the Motor Cups Holding Company of New York has been organized to promote automobile races for the silver cup donated by William K. Vanderbilt, Jr., and the gold cup donated by the Automobile Club of America, and known as the Grand Prize Cup. The company was incorporated on August 30, with a capital of \$5,000. The incorporators are William K. Vanderbilt, Ir., Henry Sanderson, Colgate Hoyt, Harry Payne Whitney, Harry B. Anderson, Elbert H. Gary, William Pierson Hamilton, H. B. Hollins, Dave Hennen Morris and Mortimer L. Schiff. Both events may possibly be held this fall. The Grand Prize race will probably be held again at Savannah, Ga., as the Savannah A. C. is negotiating for it, while the Vanderbilt Cup race may be held on the Long Island Motor Parkway.

Jackson Company Claim W. & S. Trophy.

The Jackson Automobile Company have made a formal claim to the American Automobile Association for the possession of the \$10,000 Wheeler-Schebler Trophy, which was offered as a prize in a 300 mile race at Indianapolis, Ind., which was called off in the 235th mile on account of various accidents. A Jackson car was in the lead at the time the race was called off. The A. A. A. officials state that according to its rules when a race is not completed there is no winner. The referee at the meet made a ruling of "no race" and will probably be sustained by the contest committee.

Ohio 1910 Number Tags.

The State Automobile Department of Ohio will take steps next year toward a better enforcement of the State automobile law. To that end a large number of facsimiles of the 1910 tag will be distributed to all peace officers in order that the genuine tag may be more quickly identified. The 1910 tag will be of heavy sheet iron especially prepared to withstand the wear and tear, and painted with a mahogany color. In addition to the serial number the tag will contain the word "Ohio" at one end and "1910" at the other end.

Metz Manufacturing Company Incorporated.

The Metz Manufacturing Company has been incorporated under Massachusetts laws at Waltham, Mass., to take over the business of the C. H. Metz Company, which nearly a year ago bought out the Waltham Manufacturing Company. The new company is capitalized at \$500,000. The directors are: John C. Robbins, president; Charles Spiegelberg, treasurer, and Charles H. Wolfe. Mr. Metz is the majority stock-holder. The company will continue to manufacture assembled parts for a runabout, which are sold under what is known as the Metz plan, the purchasers doing the final assembling themselves. It is said that nearly 200 men are at present at work in the company's plant. There has been some talk of removing the business to some other city, but the Waltham Business Men's Association has taken the matter up, and will make endeavors to hold the company.

Massachusetts Dealer's License Suspended.

The Massachusetts State Highway Commission has suspended the operator's license of Arthur L. Wilson, of Greenfield, a dealer in automobiles, for having in his employ the last six months unlicensed persons and allowing them to operate automobiles, and for failing to keep a proper record of the automobiles entering and leaving his garage or place of business.

### Anti-Dust Treatment of Milwaukee Streets.

The use of asphaltoilene as a dust layer has proven satisfactory in Milwaukee, and the city has bought an entire tank car from the Standard Oil Company, and has established a small storage plant at Riverside Park. Learning from a motoring trip in Illinois how successful the oil product was in abating the dust nuisance, automobile owners along Terrace avenue sprinkled that street at their own expense. As it proved very satisfactory there, the city ordered the sprinkling of other roads on which there is much automobile traffic, and the Board of Public Works then decided to treat all parkways with the preparation this year.

The mixture consists of asphalt and oil, and is said to preserve the crowning of the street by absorbing all dust wearing off of the macadam, as well as waterproofing the road and thus preventing injury by water. Water sprinklers are unnecessary where a road has been treated with the preparation. The cost is said to approximate 7 cents a square yard.

### Reduced Rates to Atlanta Show.

The Southeastern Passenger Association at a recent meeting in Chicago agreed upon a rate of fare of three cents per mile, one way distance, for the round trip to the Atlanta automobile show, to be held in November. This rate will apply not only in the territory of the Southeastern Passenger Association but probably to other terri-

tories in the East and West. The selling date and final limits for tickets for the auto show and races were left to a committee of Atlanta railroad lines.

#### Ohio Registrations.

According to the report of Fred H. Caley, Ohio State Registrar of Automobiles, the total revenue of the automobile department for the month ending August 15 was \$14,617.50. The revenue for the quarter ending at the same time was \$50,877: which is more than one-half of the total revenue derived from the automobile tax during the first year of the department's existence. More than 21,000 cars have been registered in Ohio to date, and it is believed that there are more automobiles in the State than in any other State with the exception of New York.

During the past month 1,340 owners registered cars, at a cost of \$6,569. There were also registered 424 chauffeurs, at a cost of \$848, and ten dealers, at a cost of \$100. Renewal papers were filed by 1,409 owners of cars and 24 manufacturers. During the quarter which ended August 15 there were registered 5,231 owners, at a cost of \$25,582, and 1,222 chauffeurs, at a cost of \$2,444. Dealers and manufacturers' licenses were issued to the number of 69, at a cost of \$690. Renewal papers were filed during the quarter by 4,249 owners and 10 dealers.

#### Must Keep Away from Hydrants.

Obstructing the work of the fire department by leaving motor cars standing on the curb within 5 feet of any fire hydrant has been made a misdemeanor by the city council of Los Angeles and, after a week of warnings only, the police are enforcing the new ordinance. In several instances automobiles were backed dead against fire hydrants, forcing the firemen to move the car before they could attach their hose and turn on the stream, thus causing loss of valuable time.

### Parry Automobile Company's Plans.

In announcing its plans the Parry Automobile Company, organized on July 28 at Indianapolis, states it will manufacture 5,000 cars during 1910, the first deliveries for the season to be made the 1st of October. Two models, a runabout and a touring car, both equipped with a four cylinder, 30 horse power engine, will be manufactured. The company has its new plant in the buildings formerly occupied by the Standard Wheel Company in operation.

# Want Tincher Company Sale Annulled.

A petition to set aside the sale of the Tincher Motor Car Company plant at South Bend, Ind., has been filed in the Superior Court by Charles L. and William C. Rayfield, stockholders. The Rayfields ask that the owners be restrained from distributing the assets, alleging that they

were prevailed upon to sign, unknowingly, an agreement to dispose of the company's plant. They say that they were led to believe that their signatures were necessary to make the sale of stock possible.

Demand for Second Hand Cars in Indianapolis.

Automobile dealers in Indianapolis report an unusual demand for second hand cars and a majority of the dealers have only one or two such cars in stock. The demand is said to be due to the fact that many dealers have sold their 1909 allotments and will not have any more cars for several weeks. Rather than wait indefinitely for cars, purchasers are taking second hand cars. Last year there was very little demand for such automobiles.

### Injunction Applied for to Prevent Lowell Races.

On Tuesday a young man was killed on the Lowell race course by Joe Matson, a driver, who was practicing for the race.

The same day Mrs. O. A. Gray, a property owner, whose lands front on 'the course, petitioned the Equity Court in Boston for an injunction to prevent the race on the ground that the act of the Legislature sanctioning it is unconstitutional, and that it would damage her property.

It is further claimed in the petition that while the special act sanctions the race, it does not sanction the practice for it, which has been going on for two days past.

Judge Dana, of the Superior Court, issued an order of notice on the Lowell Automobile Club, returnable at 10 a. m. Thursday, at which time his decision will be rendered.

### Speeder Banished from New York.

Felix Droit, a chauffeur, who had twice before been convicted of speeding, and the last time was sentenced to thirty days in jail and a fine of \$250, was again charged with the same offense before Judge Zeller in Special Sessions, New York, last week. The judge suspended sentence on the promise of Droit that he would never drive an automobile in the State of New York again. Droit, who has taken part in several races, including one Vanderbilt Cup race, was convicted of having driven at 20 miles per hour on Fifth avenue, between Ninth and Eleventh streets, on August 19.

### General Motors Stock Entered on New York Curb Market.

Both the common and the preferred stock of the General Motors Company have been entered on the New York curb market, and the first sale of common stock was made on August 31, at 155. The par value of both shares is \$100. It is stated that of the total of \$5,500,000 common stock authorized, \$2,724,580 has been issued, and of the \$7,000,000 preferred stock authorized, \$4,797,893 has been issued. The latter shares bear 7 per cent. interest, payable semi-annually, April 1 and October 1.

### MINOR MENTION



The Atlanta Automobile Association, which is building a race track at a reputed cost of \$300,000, has set the date of the inaugural meeting for November 9 to 13.

The Chansler & Lyon Motor Supply Company are now located at 916 East Pike street, Seattle, Wash. The firm's new home is well fitted. W. A. Avery is the manager.

J. G. Hatch and C. M. Dodd have opened a supply store at 914 East Pike street, Seattle, Wash., handling the goods of the Moore Motor Supply Company, of San Francisco.

The American Distributing Company has moved its headquarters from Cleveland, Ohio, to Jackson, Mich., so as to get in closer touch with the factories in the latter city which it represents.

The Long Distance Telephone Manufacturing Company, of South Bend, Ind., have secured a \$200,000 contract for automobile change gears, which are to be delivered within the next nine months.

The Badger State Tanning Company, of Sheboygan, Wis., has organized a department for manufacturing carriage leathers, and hopes to supply automobile manufacturers with the new product in the future.

Wm. L. Howard, of Trenton, N. J., has recently obtained two patents on a demountable rim which he intends to place on the market. Mr. Howard is manager of the Howard Cycle Company, 152 North Board street, Trenton.

The partnership between Joseph W. Owen and Eldie P. Wood, under the firm name of Owen & Wood, Los Angeles, Cal., has been dissolved, and the automobile and taxicab livery business conducted by the firm will be continued by Mr. Owen.

The Quaker City Automobile Club have decided to ask for the services of the State Fencibles for guarding the course in Fairmount Park on which their 300 mile race will be run October 9. The assignment of 400 soldiers will be asked for.

It is reported that the factory in Jackson, Mich., formerly occupied by the Buick Motor Company and which has been entirely reconstructed during the past two months, will be used for manufacturing trucks by the General Motors Company.

An unusually large shipment of automobiles recently went over the Lake Shore Road from Detroit to Chicago, and thence over the Chicago & Northwestern to Minneapolis, where the train was broken up. It contained forty-two cars loaded with several hundred Ford automobiles.

John O. King, inventor of the leather automobile tire, has brought suit against Lucius J. Elliott, a former partner, for \$30,000, which he claims he lost through "liott dissolving partnership with him, and

together with another man manufacturing the tire invented by King, patents on which were at that time pending.

The Moreland automobile factory may be located in Long Beach, Cal., if certain conditions of the promoters are met. Jotham Bixby, "father of Long Beach," is reported to be willing to donate a site of from 2 to 5 acres for the plant.

With the object of manufacturing an automobile cleaner, the Aquilla Chemical Company has been organized at Milwaukee, Wis. The new company is capitalized at \$5,000, with V. W. Alexander, W. A. Alexander and Frank C. Schoenherr as incorporators.

It is reported in Detroit that John G. Utz, formerly with the Chalmers-Detroit Motor Company, is organizing a company to manufacture a large car, and that another runabout is being developed by a local machine shop firm, which is said to be backed by General Motors capital.

The Kansas City branch of the Ajax-Grieb Rubber Company will move to new and larger quarters at 1606 Grand avenue some time the coming fall. This location is right in the centre of Kansas City's automobile row. The branch is now located at 1422 Grand avenue.

The firm of Wilberding & Brandewiede, Cincinnati, Ohio, has recently been incorporated with a capital stock of \$10,000. The firm conducts an automobile repair shop at 108 West Court street, and makes a specialty of overhauling engines and changing air cooled to water cooled engines.

The Columbia Electric Company, of Knightstown, Ind., manufacturers of the Leader car, have been reorganized. Moses Vandenbark has sold his stock to Luther and Earl Frost, of Greenfield, Ind., and Lon Thomas, of Willow, Ind. The new owners plan to increase the capacity of the plant.

During the week ending August 21, 168 cars were registered in New Jersey, as compared with 107 the same week last year. The most numerously represented makes were as follows: Ford, 19; Cadillac, 13; Maxwell, 13; Buick, 12; Olds, 7; Autocar, 7; Locomobile, Pope lines and Packard. 6 each.

The United States Pump and Tank Company has recently been organized at St. Louis, Mo., to manufacture automobile parts. Following are the officers of the company; J. J. Behan, president and treasurer; J. Curtis Barcus, vice president and local manager, and Fred F. Davis, secretary and general manager.

The Maxwell-Briscoe Motor Company, Tarrytown, N. Y., have made arrangements for parking 500 cars at the Lowell automobile races, having secured a reservation on the Lowell boulevard, from where a splendid view of the races may be had. All owners of Maxwell cars will be offered space in this reservation free of charge.

The Falls Rubber Company, of Cuyahoga Falls, Ohio, will have their administrative office in Akron, Ohio. J. N. Weid has resigned from the company, and the

board of officers is now as follows: Dr. S. H. Sturgeon, president; W. G. Short, vice president; H. F. Siegrist, secretary and treasurer, and Wm. Sherbondy, superintendent

C. A. McKiearnan, of Carthage, Mo., has constructed an automobile, and is organizing a company for its manufacture among local capitalists. A report on the car by H. F. Borbein, of St. Louis, has been submitted to local investors, and a committee has been named to place \$50,000 worth of stock in the new company.

Among recent additions to the membership of the Detroit Wholesalers' Association are the Anderson Carriage Company, Everitt-Metzger-Flanders Company, Cadillac Motor Car Company, Hupp Motor Car Company, Ford Motor Company, Briscoe Manufacturing Company, Packard Motor Car Company, Chalmers-Detroit Motor Company and Regal Motor Car Company.

The Middletown Buggy Company, of Middletown, Ohio, are planning to manufacture motor delivery wagons in two sizes for the coming season, one a light delivery wagon for useful loads of from 1,000 to 1,200 pounds, and the other one a heavier car for loads of from 2,500 to 3,000 pounds. The two cars will be equipped with solid rubber tires of 2 inches and 2½ inches width, respectively.

#### The Premier Glidden Protest.

H. O. Smith, president of the Premier Motor Manufacturing Company, of Indianapolis, has issued the following statement:

"The Premier Company regrets the necessity of making a protest on a point which on the surface might seem so trivial, but a number of cars have proven so good that only small points of vantage could be found by the technical committee at the conclusion of the strenuous run as the basis for determining awards.

"However, this contest was run under certain rules, and the rules specified under 'Qualifications,' paragraph 5:

Cars shall at all times during the tour carry mufflers and guards, and be fully equipped as per manufacturers' catalogue specifications, except that tops and wind shields need not be carried.

"The two roadsters of the same make as the car which was awarded the Glidden Trophy, which carried their lamps attached in the same manner as provided on the touring car of that make, suffered in consequence on account of the bad roads, by one having a bent bracket and a badly crushed lamp and the other by having the receptacle in the rear to which the lamp and bracket is attached entirely dragged off.

"The failure to carry lamps was in itself a violation of the rules, and judging by the experience of the roadsters of this make, which carried the full equipment, it is fair to assume that the touring cars which did not carry this equipment the entire distance escaped at least as much damage as was done to these two roadsters, and a report of the penalties shows that the roadster of this make, No. 109, with a total of 10.2 points,

harged among other things for retool box, bracket and tail lamp, 3 for time; bracket, 1.2 points for matail light, 3.2 points for material; other cars in the contest were charged mps and brackets, and in addition one are cars were compelled during the tal examination to light their oil to show that they were in good gondition."

#### lore Combination Rumors.

reported that George B. Cox, a prompolitician of Cincinnati, Ohio, is ening to combine several Eastern autofactories. A representative of Cox st returned from a visit to one of the less named in connection with the deal.

#### Garage Notes.

. Wetmore has established a garage at Corrille, Is. He has the agency for Chalmers

Segerstrom Auto Co., agents for Ridercars in Minneapolis, have moved to 219 1 street. South.

Allen-Kingston Motor Car Co. has secured ear lease at \$7,200 per year on a property adway, New York.

I. Gulestian, Cambridge, Mass., has bought of ground near Harvard Bridge, on which erect a fireproof garage building. garage of Scott & Shannon, Rugby, N.

garage of Scott & Shannon, Rugby, N. was destroyed by fire recently, and damage 2 \$7,500 and \$10,000 was caused.

t. Waters & Son, who handle the Stevensin Minneapolis, Minn., have secured temquarters at 24 Eighth street South.

Hutchinson has purchased the Arlington, Arlington, Cal., from R. D. Woodward, Il move it back to its former location.

. Doyle, St. Cloud, Minn., will erect a two 100 feet square garage building, to cost 520,000. The location has not yet been deed upon.

ris & Reed, Sioux City, Ia., have bought out ntral Machine Works, whose plant they will t into a garage. They are general agents ack automobiles.

Georgia Automobile Exchange, Columbus, is increased its capital stock to \$25,000, and once erect a modern garage building with om and repair shop.

Odd Fellows Hall, on Broad and Spring streets, Philadelphia, has been purchased automobile company, which will erect a concrete garage on the site.

H. D. Ryus, who was formerly connected he White garage in Los Angeles, and rewas appointed agent there for the Corbin a opened a garage on Broadway.

C. Wilson and Fred Gumbert, who handle purist and Locomobile in Portland, Ore, noved into a new garage on Alder street, be-Sixteenth and Seventeenth streets. This of the largest garage buildings in the city, ing 160x70 feet.

Jones Automobile Exchange, of Wichita, will erect a \$30,000 garage as soon as the re completed. The building is to be 50x140 nd will have a pressed brick front. The part of the floor space will be occupied by ral agency of the Ford Co., which is con-

by Mr. Jones.

Phillips Automobile Co., St. Louis, Mo., ecured a permit from Mayor Kreismann to a garage in the alley east of Kings Highetween Page and Easton avenues. The ty some months ago applied for a permaranchise for the garage, but the application posed by residents in the district, and the denied it. The mayor now has granted mpany a ninety day permit so that they

may demonstrate that the garage can be conducted without being a public nuisance.

George Fuller, of Deadwood, S. Dak., has sold his garage to J. C. O'Donnell, Jr.

Joseph B. Dryer, St. Louis, Mo., is building a garage at 1521 North Grand avenue. He expects to secure the agency for a line of cars.

The Maxwell-Briscoe Automobile Co., Kansas City, Mo., has let the contract for a three story garage building at 1612-1614 Grand avenue.

The Studebaker Automobile Co., Louisville, Ky., are negotiating for the purchase of a property at Fourth and York streets, where they plan to establish a salesroom and garage.

The C. F. Bullwinkel Estate, district agent for the Studebaker and allied lines at Jefferson, Wis., now occupies its new garage, which includes large offices and a big supply department.

G. M. Irwin will open about September 1 the Uptown Garage, at 154, 156, 158 and 160 West 124th street, New York, with storage facilities for 300 cars. An agency will also be taken.

A. P. Hess, formerly of Montesano, Wash., has recently incorporated the Avenue Automobile Co. at corner Seventh and Pacific avenue, Tacoma, and will handle the Franklin cars during 1910.

W. C. Cook and Henry Allingham, San Diego, Cal., have bought the Union Garage from the Southern Electric Co. Cook was foreman of the garage for two years, while Allingham formerly conducted an automobile service.

The White Garage Corporation of Los Angeles, Cal., which was first organized several years ago, and reorganized about a year ago by Col. F. C. Fenner, has given up the agency for White cars, and will take on several other lines.

N. C. Bickle, of Chardon, Ohio, has leased the old unoccupied Chardon Baptist Church, which he will remodel into a garage. The church was built about seventy years ago, and was abandoned on account of the dwindling of the congregation.

The Woolwine Motor Car Co., Los Angeles,

The Woolwine Motor Car Co., Los Angeles, Cal., have let the contract for a single story pressed brick garage, 70x165 feet, on Olive street between Eleventh and Twelfth. The company will this year handle an extensive line of cars.

W. O. Houghton, Galva, Ill., has purchased a building site, and will immediately begin the construction of a single story garage building with a frontage of 30 feet and a depth of 60 feet. The building has already been leased to Hal Bailey.

Walter J. West, an automobile dealer of San José, Cal., disappeared on August 9, and no clue to his whereabouts can be found. He is said to have had no financial trouble, and it is thought that his disappearance may have been due to temporary insanity.

Frank C. De Water and Edwin De Water, of

Frank C. De Water and Edwin De Water, of Islen, N. J., have leased a property at 71 Prince street, Elizabeth, N. J., for one year beginning December 1. There are two buildings on the premises, which are to be used for live and dead storage respectively.

Milton Stiles, Ventura, Cal., will erect a two story garage building on the corner of Main and Palm street, instead of a single story building as formerly planned. The upper story will be fitted up for office rooms. The building will have a pressed brick front.

Long & Histed, who have recently taken the agency in Kansas City for American Simplex, Overland and Brush cars, are making extensive improvements to their salesrooms and garage at 1527 Grand avenue, including a hardwood polished floor in the salesroom.

Arthur E. Genereaux, of Cleveland, Ohio, has secured a half interest in the Central Garage on Union street, Pasadena, Cal., and will be manager of the garage in the future. Connected with the garage are the agencies for the Oldsmobile, Chalmers-Detroit and Hudson cars.

The Lucia Brothers Motor Car Co. is the new name of the well known Green Bay, Wis., agency and garage firm, which was established under the name of Lucia Cycle Co. in 1888. The company is probably the largest dealer in motor cars in Wisconsin, exclusive of Milwaukee, and besides its main garage at 218 and 220 North Adams street. Green Bay, has a large branch garage at

Oconto, and branch agencies in several other large cities in northeastern Wisconsin. The company represents the Chalmers-Detroit, Hudson and Thomas.

The Atlas Machine Co. has been organized in Louisville, Ky., with \$40,000 capital stock, to handle the Empire car, which was described in our last week's issue.

The newly established Pittsburg branch of the H. H. Franklin Manufacturing Co., of which W. F. Reynolds is manager, has secured headquarters at 5926 Baum street, of which it will take possession on September 1.

The Oxford Hardware Co., Oxford, Ohio, will erect a garage building on a lot recently purchased. It will be of L shape, 80 feet deep on one side, and 40 on the other. The company expect to handle several lines of automobiles.

The Banker Brothers Co., of Pittsburg, has been reorganized as the Pioneer Motor Car Co., with W. J. Lewis as the active head. The new company will take over the entire business of the old one, and will handle the Lozier, Hudson and Chalmers-Detroit cars.

Cuyler Lee, a prominent San Francisco dealer, has let the contract for the erection of a \$70,000 garage and salesroom on Jackson street and Van Ness avenue, on a site which was recently purchased for \$45,000. The building will be three stories high, 67x125 feet.

Pugh Brothers, who handle the Elmore, Overland and Autocar truck in Providence, R. L., will move into their new garage on Mathewson street on September I. The garage has storage capacity for seventy-five cars, and comprises a well equipped machine shop.

well equipped machine shop.

A sort of motor mart building is at present being erected at 223 Peachtree street, Atlanta, Ga. Space in the new building has already been let to Frank Steinhauer, who is at present conducting a garage in an old skating rink in the rear of the Aragon Hotel, and to J. E. Levi & Co., who represent the Reo.

Protheroe & McGinnis, of Baraboo, Wis., are building an addition to their garage on Third avenue. The building will be of solid brick, 44x90 feet, and will be used exclusively for storage and livery. The present building, 24x72 feet, will be used for exhibits, accessory department and repair shops,

A Baltimore automobile firm is negotiating for the purchase of the property at the east corner of Mt. Royal avenue and McMechen street, formerly used as a car barn by the United Railways. The property has a frontage of 202 feet, a depth of 165 feet, and is improved with a one story brick building well adapted for use as a garage.

The Shaw Auto Livery Co., of Chicago, has secured a building permit for a garage in Evanston avenue between Grace street and Waveland avenue. Objection was raised to the application by a property owner in the vicinity, who held that the block was a resident block, and that frontage consents were necessary. The Shaw Co. succeeded in obtaining the necessary signatures.

The H. O. Harrison Co., of San Francisco, agent for the Peerless car, is occupying a new brick and steel building, two stories high, in Mission style, on Van Ness avenue, near its junction with Golden Gate avenue. The front is devoted to offices and showroom, while in the rear a large stock of parts is kept. The repair room, on the second floor, is reached by a large elevator.

second floor, is reached by a large elevator.

A. J. Winters Co., Portland, Ore., have bought the stock, lease and fixtures of the Coleman Hardware Co., and are adding a stock of automobile supplies. They are at present installing a modern vulcanizing plant in the rear of an adjoining building. They plan to do a general wholesale business in shop tools and automobile supplies, and will issue a general tool and supply catalogue.

Bids have been asked for on a 50x126 feet single story garage building to be erected on Prospect street, Bellingham, Wash., by the Long Estate. The front will be of light cream pressed brick, and will have large plate glass windows. The floor will be of cement. There will be a 16x24 foot office and accessory room in the forward portion of the building, and a 26x50 feet repair shop in the rear.

#### Trade Personals.

Hobart M. Adams has resigned as manager of the local and State retail department of the White Co., Cleveland, Ohio, and has been succeeded by Frank E. Stiverson.

H. D. Penney, who was formerly connected with the Remington Arms Co., of Ilion, N. Y., has accepted the position of tool designer with the Toledo Motor Co., Toledo, Ohio.

L. G. Hupp has resigned as commercial agent of the New York Central lines in Grand Rapids. Mich., and on September 1 will accept a position with the Hupp Motor Co., of Detroit.

Nelson S. Gotshall, who was manager of the Studebaker and E-M-F sales branch in Minneapolis until recently, has become Western sales manager for the Simplex Motor Car Co., of Mishawaka. Ind.

S. B. Robertson has resigned as assistant manager of the Studebaker branch in Kansas City, and on September 1 will assume the management of the Buick branch in St. Louis, succeeding E. W. Nothstine.

H. A. Post, formerly of Buffalo and Denver has been appointed sales manager of the Falls Rubber Co., Cuyahoga Falls, Ohio. The com-pany, which was organized recently, will manufacture a line of automobile tires.

Paul L. Snutsel, foreign representative of C. F. Splitdorf, sailed Saturday, August 28, on the S. S. Zeeland for an extended trip to London, Paris, Turin, Barcelona and Brussels, in each of which cities Splitdorf branches have been established.

W. A. Webber, formerly manager of the New England agency for American cars in Boston, has recently assumed the position of sales manager for New England for Allen-Kingston cars, and will make his headquarters in Boston with Warren I. Jacobs, New England distributor for Allen-Kingston cars.

Arthur W. Haile has been appointed city sales manager for the E. R. Thomas Motor Co., of Buffale, N. Y., succeeding C. T. Paxon, whose appointment as manager of the Chicago Thomas branch was announced in our last issue. Haile was assistant city sales manager in Buffalo for the past three years.

O. L. Weaver, who for ten years was connected with the Goodyear Tire and Rubber Co., during the last six as manager of their Cincinnati branch, has severed his connection with that company to become factory sales agent for Over-land cars in eastern Ohio, western Pennsylvania and West Virginia, with headquarters in Cleve-

#### New Incorporations.

The Columbia Taxicab Co., St. Louis, Mo.-Capital stock, \$200,000.

Renault Frères Selling Branch, Chicago, Ill.-Capital stock, \$5,000. Incorporators, Wm. Burry, G. M. Peters and D. R. Eichberg.

The Coston Automobile Co., Asheville, N. C.-Capital stock, \$2,000. Incorporators, E. V. Reynolds, J. A. Coston and Junius Adams.

The Saurer Motor Truck Co., West Orange, N. J.—Capital stock, \$200,000. Incorporators, W. D. Sargent, West Orange; G. M. Judd and E. H. Fallows, New York city.

The Auto Tire and Repair Co., Cincinnati, Ohio. -Capital stock, \$10,000. Incorporators, Alexander Schwendler, Francis A. Hoover, R. D. Anderson, G. W. Ernest and Tillie M. Anderson.

Studebaker-Colorado Vehicle Co., Denver, Col. -Capital stock, \$100,000. Incorporators, Frank S. Fish, president; W. S. Hunnewell, vice president and treasurer, and Elias K. Pound, secre-

#### New Agencies.

Phonix, Ariz.-J. Johnson, Buick. San Francisco, Cal.-A. J. Smith, Elmore. Aberdeen, S. Dak .- Leach & Shelley, Velie. Imaha, Neb .- Butler & Corkhill, Apperson. Fond du Lac, Wis.-Edwin G. Mitchell, Ford. Oxnard, Cal.—J. Arthur Scott, Pope-Hartford. New Orleans, La.—H. A. Testard, Pope-Hart-

Washington, D. C .- Cook & Stoddard Co., Franklin

Columbus, Ind. - Donner-Cox Automobile Co., Studebaker.

Albert Lea, Minn.-The Albert Lea Hardwood Co., E-M-F.

Council Bluffs, Ia .- David Bradley & Co., Patterson "Thirty."

Nevada City, Cal.-The Alpha Hardware and Supply Co., E-M-F.

Des Moines, Ia.—Cruzan & Co., 204 West Walnut street, Cartercar.

Houston, Tex.—Lea, McKallip & Abbey, 714 Main street, Jackson and Babcock.

Chicago, Ill.-Kramer Motor Car Co., 1413 Michigan avenue, American Simplex.

#### Patents Issued July 6, 1909.

926,745. Motorcycle.—George M. Hornecker, Whiting, Ind. Filed March 11, 1908.

926,753. Vehicle Steering Gear.—Samuel D. Latty and Henry T. Latty, Cleveland, Ohio. Filed November 21, 1906.

926,757. Puncture Indicating Device for Tires. -James L. Marmaud, Worcester, Mass. Filed September 14, 1908.

926,783. Vehicle Wheel.—James W. Thompson.

Wham, La. Filed June 17, 1908. 926,797. Transmission Gearing for Automo--Martin L. Williams, South Bend, Ind.

Filed February 12, 1906. 926,830. Vehicle Wheel.—John Sinnott, Philadelphia, Pa. Filed February 10, 1906.

926,844. Traction Wheel.—Carroll M. Bell, Goodland, Ind. Filed March 9, 1907.

926,848. Carburetor.-John A. Carlson, Denver, Col. Filed March 27, 1908.

Explosion Engine.—John Peterson and Frederick O. Peterson, Detroit, Mich. Filed February 24, 1908.

926,919. Gearing.—Alfred N. Adams, Omaha, Neb. Filed December 28, 1908.

926,929. Combined Driving and Steering Wheel for Automobile Axles.-Silas V. Dusseau, Erie, Mich. Filed July 27, 1908. 926,938. Motor Vehicle.—George T. Glover,

Chicago, Ill. Filed May 7, 1907.
927,004. Explosive Engine.—Ludwig Petterson,

Chicago, Ill. Filed April 14, 1906.

927,001. Hydrocarbon Engine.-Frank L. Nichols, Stamford, Conn., assignor to Nichols Quadruple Traction Vehicle and Power Company, Mount Vernon, N. Y., a corporation of New York. Filed

February 2, 1907. 927,006. Tire.—Charles L. Schwarz, Philadelphia

927,008. Hydraulic System for the Distribution of Oil.-Luther C. Snell, Detroit, Mich., assignor to Hydraulic Oil Distribution Company, Detroit, Mich., a corporation of Michigan. Filed February

927,009. Spring Wheel.-Jacob D. Sower, Elmo, Kan. Filed August 12, 1907.

927,014. Controlling Device for Vehicles.— ichard Werkner, Budapest, Austria-Hungary, Richard Filed January 14, 1908.

927,048. Spring Controller.--Henry A. House, Bridgeport, Conn. Filed August 23, 1907.

927,075. Motor Cylinder.—David Reid, Ithaca,

N. Y. Filed January 4, 1904.
927,085. Traction Engine.—Daniel T. Timber-

lake, Baileyville, Kan. Filed August 7, 1907. 927,087. Universal Joint.—Herbert Vanderbeek, Hartford, Conn. Filed April 29, 1908.

Internal Combustion Heat Engine .-927,103. John L. Bogert, Flushing, N. Y. Filed April 1,

927,122. Vehicle Tire .- Jesse G. Cramer, East Orange, N. J. Filed July 24, 1906.

Steering Gear for Automobiles. 927.143. George S. Hill, Bradford, Mass., assignor to Hill Motor Car Company, Haverhill, Mass., a corpora-tion of Maine. Filed November 20, 1905.

Resilient Wheel.-William L. Martin, 927,154. Chicago, Ill. Filed May 11, 1908. 927,190. Piston Packing.—George R. Thomp

son, Republic, Mich., assignor to Martha Thompson, Republic, Mich. Filed December 9, 1908.

927,233. Internal Combustion Engine.—Ernest W. Graef, New York, N. Y., assignor to Elizabeth
J. Graef, Brooklyn, N. Y. Filed November 13, 1905.

927,246. Muffler for Explosive Engines-George A. Jackson, Sewickley, Pa., asignor of one-fourth to W. Miller Dickson, one-fourth to Don Rose, and one-fourth to Milton H. Knowles, Sewickley, Pa. Filed December 14, 1908.

927,254. Tire Adjuster.—Adam A. Long, Rockester, N. Y., assignor to Long & Mann Co., Rockester, N. Y., a corporation of New York. Filed May 14, 1906.

927,255. Sparking Plug for Hydrocarbon Motors.-Abbot A. Low, Horseshoe, N. Y. Filed February 20, 1000.

927,256. Motor Vehicle and Truck.-Friedrick Lüthke, Bremen, Germany. Filed December 11, 1908.

927,259. Wheel.-Iames G. Maxwell, Washing ton, Pa. Filed October 10, 1907.

927,266. Means for Securing the Tires of Automobiles and Other Vehicles.-André J. Michelin, Clermont-Ferrand, France. Filed July 31, 1907.

927,298. Pressure Gauge for Pneumatic Tires. Charles R. Twitchell, Los Angeles, Cal. Filed October 9, 1908.

927,385. Gearing.—Theodorus H. M. van Swiet-Hilversum, near Amsterdam, Netherlands. Filed February 10, 1909.

927,447. Tire Armor.—Wellington J. Belyea, Port Huron, Mich. Filed September 15, 1906. 927,463. Motor Vehicle.—Andrew W. Hamtrite, Moweaqua, Ill. Original application filed October 17, 1906. Divided and this application

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927,787. Tire Protector.-William Green, Harvey, Ill. Filed August 4, 1908. Serial No. 446.066.

927,793. Pneumatic Tire and Clamping Mean Harvey M. Hartman, Minneapolis, Minn. of one-half to Oscar P. Hanson, Minness Minn. Filed February 28, 1908.

927,797. Vehicle Spring.—Charles C. Have New York, N. Y. Filed February 11, 1909. 927,891. Vehicle Wheel.—Everett S. Stanciift,

Berkeley, Cal. Filed March 12, 1908, 927,937. Ball Bearing.—Hugo Borchart, Beria Charlottenburg, Germany. Filed September 19. 1907.

927,961. Transmission Apparatus.-Julius C. Forker, New York, N. Y. Filed June 19, 1967.
927,977. Wheel.—James J. Kelly, Crafton, Pa Filed June 22, 1008.

Tire Protector.-Charles E. Kinhel, 927.980. Council Bluffs, Ia. Filed February 12, 1907.

928,042. Carburetor.-John S. Goldbe cago, Ill., assignor to Goldberg Motor Car Devices Manufacturing Co., Chicago, Ill., a carpet tion of Illinois. Filed January 7, 1908.

928,064. Armored Tire.—Samuel T. Me Huntdale, N. C. Filed October 24, 1907.

928,069. Repair Device for Tires. Otto C. Reich, Denver, Col. Filed September 30, 190 928,110. Motor Vehicle.-Jesse W. Davis, Mil dleton, Tenn., assignor of one-half to John W. McIntyre, Pocahontas, Tenn. Filed November 4

928,121. Carburetor .- John S. Goldberg, Chi cago, Ill., assignor to Stromberg Motor Devices Co., Chicago, Ill. Filed August 17, 1908.

1008.

928,179. Body for Auto Funeral Cara-James W. Butler, Fred R. Briggs and Edwin H. Cast. Cleveland, Ohio, assignors to the Auto Funda Car Co., Cleveland, Ohio. Filed September 10 1908.

Combined Distributor and Time De 028,200. vice .- Theodor M. Mueller and Albert Jacob, Diton, Mass., assignors to Pitsfield Spark Cal Ca. Dalton, Mass., a corporation. Filed Novemb 1008.

# The Horseless Age

First Automobile Journal in the English Language

UME XXIV

**NEW YORK, SEPTEMBER 8, 1909** 

NUMBER 10

### Novel Methods of Producing Gears.

By F. E. WATTS.

demand in the higher priced autos ore quiet operation on the lower has made necessary the production is with more perfect tooth forms, and same time the advent of low priced ith two and three speed sliding gears ade it imperatively necessary to proets of reasonably quiet gears at a

e somewhat conflicting conditions in tion with the two classes of cars aused makers to experiment with vanethods of forming the teeth of their ission gears. For the production of e gears, both spur and bevel, gear or planers which generate the teeth st commonly used. During the past r so, however, there have been a rable number of hobbing machines iced into the more prominent shops, e manufacture of spur gears. In nstances these machines are giving I satisfaction, lowering the cost of ars and at the same time apparently ing gears which are more uniform in least they run more quietly. In shops the hobbing machines are deinferior to the shapers, both in cost luction and in quality of the product. question of which method is best ot appear to be decided as yet from ical standpoint at least.

no matter how well the gears are ey will still make a little noise, so the greatest quietness is required they un in" or lapped together with an e powder. That is, the gears are ed in pairs, just as they mesh when e in the change gear, and run by with the teeth dipping in a bath of ed with emery powder or some simbstance. Sometimes the shafts of running in" fixtures are arranged so eir centre distances are adjustable, that these distances can be measured usandths of an inch by means of eter heads. The gears must then be urately enough so that they will lap in quietly with these centres a specistance apart, within given limits. If ers were used soft, just as they were is probable that if the work was first omparatively little lapping would be d. But sliding gears must always dened or case hardened, and these es always throw them a little out of So we must amend our former stateor the more important cause of noise is not inaccuracy in the cutting but warping while hardening.

The gears for the cheaper cars are not generally lapped in, but even these are nearly always "run in" in oil, after being assembled in their case, for some time before placing in the car. Bevel driving gears are practically always lapped on the better cars, and even on some of the cheaper machines. So common has this process become that fixtures for the purpose are now an article of manufacture.

Quite recently a process for grinding the teeth of gears after they are hardened has been developed. Each tooth is brought exactly to size, and it is claimed that the resulting gears are practically perfect. If this process works out commercially as well as it is said to have done experimentally, the present methods of running in gears will doubtless soon become obsolete.

In the search for methods of producing gears more cheaply for parts other than the transmission system, where the gears usually do not require to be as perfect and often do not need to be made of exceptionally strong material, many ingenious methods are being tried.

Die cast gears of certain of the special die casting alloys are being tried with considerable success. They appear to be strong enough to use for driving magnetos, pumps and similar parts, and can be made quite accurate.

For bevel differentials drop forgings used rough are perhaps among the possibilities, though I do not know that they have yet been tried. Differential gears cast from some of the new cast steels are certainly practical.

Some small internal gears are being satisfactorily made by broaching. Whether a similar process can be satisfactorily used for external gears or not is a question. There would seem to be difficulties in the way of keeping the dies sharp and to size, and those tool makers with whom I have talked regarding the matter do not think the process practical.

The hot rolling of spur gears is being experimented with, but I do not know that any successful results have been attained.

For cutting spiral gears thread millers are being used where the pitch is not too great with relation to the diameter. But where the teeth run nearly axially the hobbing machines seem to be the favorite tools. Certain shapes of these gears can be pro-

duced very cheaply and they are coming more and more into favor for small work, since they are quiet and reasonably efficient.

Regular worms and worm wheels must, of course, be hobbed, but these are not used to a sufficient extent, except for steering gears, to induce the development of special methods for their manufacture.

Special forms of gears, such as pin gears, face gears, etc., are being tried for some of the cheaper cars, and it is by no means certain that some of them may not possess merit. Face gears, or more properly "crown" gears, have been tested and show an efficiency of slightly more than 90 per cent. when transmitting small powers. The pin gear transmissions may be made rather rugged, since the spur gears which mesh with the pin teeth have rather coarse pitch and comparatively narrow faces. It is probable that they can be cut quite cheaply in gangs, since very heavy cutters can be used for roughing out. It is also not unlikely that the teeth can be cast nearly or quite to size, for this has been done on teeth of similar shape used in high powered cars with rather satisfactory results both as to cost of production and quietness of operation. In the pin gears themselves, the teeth being perfectly round can, of course, be made very rapidly. Their sockets may be rapidly produced by multiple drilling and reaming. The teeth may be inserted by a magazine feed automatic machine, and the heading which secures them in their sockets is done by a spinning tool. It should be understood, of course, that the working ends of these teeth are hardened while their shanks are left soft.

All in all I think we are justified in saying that change gear design is by no means settled, and that the present activity in this direction is likely to produce some useful results.

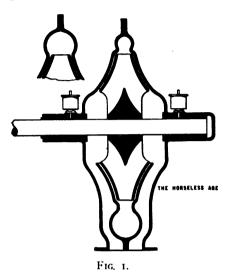
### Imports at the Port of New York.

During the month of August there were imported at the Port of New York by dealers, 80 pleasure cars, 69 taxicabs and 8 trucks, and by individuals 45 old and 11 new cars. Among the pleasure cars imported, Renaults lead with 28, followed by Fiat with 25, Mercedes with 8, Isotta with 5, etc. Of the taxicabs 49 were De Dion-Bouton and 12 Fiats. The total number of cars imported during the month was 213, and they were valued at \$478,202.66, as compared with 216 cars valued at \$431,829.43 imported in August, 1908. It will be noticed that taxicabs now form a very considerable portion of the imports.

### Construction of Centrifugal Pumps for Automobiles.

BY EUGENE P. BATZELL

Centrifugal pumps are used more and more in connection with gasoline automobile motors for circulating the cooling water. Almost every concern manufacturing its own motors manufactures also the



centrifugal pumps for them. This is the reason why there are many different types of such pumps, and not one is considered standard. But among all of these constructions can be found only a few which are really correct from the theoretical as well as from the practical standpoint.

It is true that the centrifugal pump used for an automobile motor serves only as an accessory, and may be regarded as of minor importance. Besides, if a centrifugal pump is put out of action, and all its pipe connections remain, the cooling action continues on a reduced scale, owing to thermo-siphon circulation of the water. It may also be urged that centrifugal pumps consume only little power, and their efficiency is, therefore, of no great importance. However, it is possible in each case to make a pump both theoretically and practically correct in construction by simply paying a little more attention to its design. Many centrifugal pumps actually found on automobile motors convey the impression that they were fitted to the motor more for the purpose of suiting the taste of purchasers than for anything else.

There are some designs of centrifugal pumps which, while entirely correct theoretically, are too complicated, and, therefore, too expensive to manufacture. In general, some of the types of pumps which have proven very advantageous for large stationary plants are of no particular advantage for automobile work.

It is always advisable to consider the cost of manufacture and design the pump accordingly. The price of the motor and its intended use should always be taken into account. For racing car pumps, where the cost is a small consideration, it is advisable

use a more complicated and expensive

ordinary pleasure cars the pumps must be built simpler and cheaper, however.

The general form and the dimensions of the pump parts must be made in accordance with the conditions under which the pump is

construction if the reliability can be in-

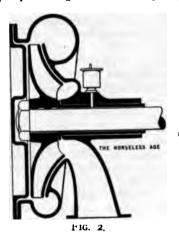
creased thereby. It is better in this case

to forestall all possibility of defect. For

the pump parts must be made in accordance with the conditions under which the pump is to operate. The most important problem is that in relation to the form of the blades for the pump wheel and the dimensions of this wheel. This problem will be discussed in detail further on.

Several forms of centrifugal pumps are shown in Figs. 1, 2 and 3. The arrangement Fig. 1 is largely used in stationary pumps, but is not particularly suited for automobile motors. It necessitates the use of complicated and expensive castings. The friction surface between the water and the passage walls is great, as the passages are divided into two, each of small area. When the wheel is cast the inside surface of the passage walls generally comes out very uneven, as the size of these passages is small, consequently friction losses are further increased and the effective cross sectional area is reduced.

This arrangement necessitates splitting the pump housing in a central plane, as



shown. Such a joint is generally very undesirable. It is hard to keep the joint tight when the flanges are not large and the joint screws are not big enough. It is generally impossible to have both the flanges and the screws of the proper size, as the outside dimensions of a centrifugal pump for an automobile motor are nearly always limited by the small space between the bonnet and the crank case. If a part of this space were were to be occupied by a large flange the pump wheel would have to be made proportionately smaller, and this would decrease both the pressure and the delivery of the pump.

One other reason why a joint in the central plane of a pump is hard to keep tight is that this plane lies parallel with the direction of the water passing through the diffuser. The water tends to penetrate

through the joint directly, and this effect is increased by centrifugal action.

The one advantage of this construction, viz., complete absence of thrust on the pump shaft, is of no great importance in the case of automobile pumps, as there the thrust is very small. Besides, it is necessary, anyhow, to provide thrust bearings for both directions, so that the wheel with its shaft may not be thrown out of position by the vibration of the automobile.

The arrangement Fig. I could in any case be advantageous only in pumps of large size for big motors, where it is desired to circulate great quantities of water. But in ordinary cases, even for racing cars, simpler constructions, like those shown in Figs. 2 and 3, would be preferred.

Fig. 2 shows a pump comprising a wheel with completely enclosed water passages. Fig. 3 shows a pump with water pasages open on one side. This last construction is the cheapest, because the wheel can be cast without cores. But theoretically it possesses some disadvantages. Owing to the difference in pressure at the entrance and exit of the wheel passages there is always a back flow of water through the cheeks, between the wheel and the housing. In the pump Fig. 2 this back flow of water is separated by walls from the main flow through the wheel passages. In the pump Fig. 3 these two flows are in direct contact and form eddy currents, which decrease the efficiency of the pump. These extra losses are reduced, however, by the fact that while in construction Fig. 2 the inside walls of the wheel passages cannot be smoothed, and must remain as rough as the casting is made, in the construction of Fig. 3 these walls can easily be considerably smoothed, even when the casting is only cleaned by a sand blast.

Another difference between constructions 2 and 3 relates to methods of machining. The outside of the wheel in Fig. 2 can easily be roughly finished, which is all the finish required. It is harder to finish the wheel in Fig. 3 to the correct shape on the side where the blades are open.

Where cost of construction is a very important item it is advisable to follow the design Fig. 3. The wheel passages must be made larger; that is, of greater area than



Fig. 3.

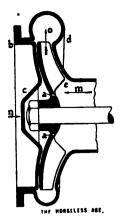
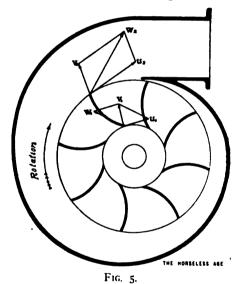


Fig. 4.

is required theoretically for the quantity of water to be circulated in a given time, owing to the back flow already referred to. It is, of course, advisable in any case to make the passages rather large, so as to keep down the velocity of the water from 8 to 10 feet per second for the maximum discharge.

In pumps Figs. 2 and 3 there is a certain end thrust on the pump shaft, as the lateral surfaces of the wheel at the right and left



side from its passages are not equal. It will be seen from Fig. 4 that the area of the side ed is smaller than that of bc. As the water pressure per square inch on both these surfaces is the same, there will be a thrust on the pump shaft in the direction indicated by the arrow n. This thrust may be decreased by drilling a few small holes a close to the beginning of the blades. This thrust is slightly decreased by the reaction due to the change in directions of the water flow in the wheel from n to a.

Thrust in the direction opposite to arrow n occurs in pumps Figs. 2 and 3 at the moment of starting. There is then no pressure on the sides e d and b c, but the reaction due to the change in directions of the water is present. Thrust bearings for taking up the thrust in both directions are therefore necessary for pumps Figs. 2 and 3.

An advantage of pumps Figs. 2 and 3

over pump Fig. 1 consists in the simpler pump housing. Also the joint between the two valves can be located to one side of the largest diameter of the diffuser, so the flange will not increase the over-all dimensions, and the whole pump can be made larger. It is also easier to keep this kind of a joint tight, as the water coming out of the wheel flows in a direction perpendicular to the plane of the joint.

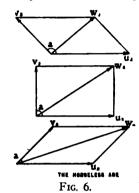
The pump Fig. 1 usually has two bearings for the pump shaft, one at each side of the wheel. In the pumps Figs. 2 and 3 it is preferable to use only one long bearing, if the shaft does not need to be carried out of the housing for some purpose. With a long single bearing on the shaft it is possible to do without a stuffing box, provided the bearing is located on the suction side of the wheel. If the bearing is located on the other side of the wheel, where the pressure is theoretically almost equal to that in the diffuser, it is better to use a stuffing box, particularly if the bearing is not made very accurately. This last construction, with a single bearing located on the pressure side of the pump, allows of a simpler arrangement for conducting the water to the wheel (Fig. 3). When the bearing is located on the suction side of the wheel the pump intake becomes more complicated, as the incoming water surrounds the pump shaft (Fig. 2).

Aside from the construction of the wheel the diffuser also plays a very important part in a centrifugal pump. This part, by which the water, after leaving the wheel, is directed to the pump outlet, is most correctly made of spiral form (Fig. 5). The largest section of the spiral is known, being equal to the pump outlet opening. A few more sections are calculated, they being proportional to their distance from the beginning of the spiral, and then the whole passage can be drawn.

If it is desired to keep the losses in the pump low then that portion where the water leaves the wheel and enters the diffuser may be laid out, as shown in Fig. 1, at a. Here the housing extends beyond the side

walls of the wheel, and there is no sudden change in the area of the water passage. But ordinarily the construction shown at b, Fig. 1, or that of Fig. 3, would serve the purpose.

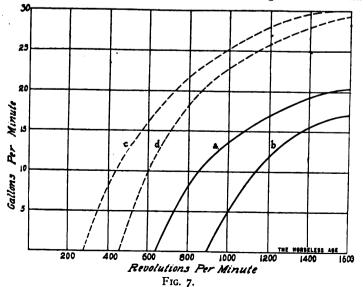
The diffuser serves the purpose of converting the high speed, low pressure flow of water into a low speed flow of higher pressure. For instance, if the water leaves the wheel with velocity  $v_2$  (Fig. 6), and if the peripheral speed of the wheel is u, the absolute velocity of the water is equal to the



resultant of  $v_2$  and u, which is represented by  $w_2$ . A part of the velocity  $w_2$  can be transferred into pressure in the diffuser. If the water leaves the diffuser with a velocity v, then the increase in pressure in the diffuser is proportional to  $w_2^2 - v_2^3$ .

If the velocity  $v_2$  is constant, then  $w_2$  depends upon the velocity u2 of the wheel, and also on the angle between the outer portion of the wheel blade and the wheel circumference. as the velocity v2 is always in the direction of the outer end of the blade. Fig. 6 showshow we changes when the angle a of the blades is changed, but both velocities v2 and u2 remain constant. It shows that when the angle between the velocities v2 and u is decreased, and therefore the pump is able to work at higher pressure, then velocity wa is increased. It is therefore possible to use the same pump for both low and high pressure, by simply arranging the form of the blades accordingly.

In determining the form of blades for a



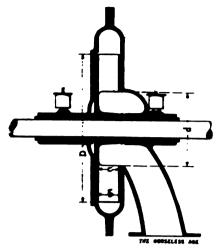


FIG. 8.—FAULTY CONSTRUCTION.

pump it is necessary to consider that the radiator may sometimes not be full of water; whether the motor will often have to deliver much power at low speed, and at what speed the motor will be run the most.

Very often the pump is driven at the same speed as the magneto. For six cylinder motors this is equal to one and one-half times crank shaft speed, and for four cylinder motors equal to crank shaft speed. The same pump could then be used for six cylinder motors as for four cylinder ones, only the blades of the wheel would have to be more inclined backward. But if the six cylinder motor is run much at low speed (at which it is able to develop much more power than the four cylinder), then it would be advisable to use the same pump as a four cylinder motor of equal power rating.

In Fig. 7 are shown some curves representing the discharge of a pump as a function of its revolutions per minute. Curve A is of a pump in which the rotor blades were inclined back from the direction of rotation. Pumps with blades inclined backward should be used only on racing cars. The inner end of the blades must always be inclined in the direction of rotation of the wheel, so as to make an angle of 50 to 70 degrees with the radial line (Fig. 5).

In conclusion may be shown a number of faulty designs of centrifugal pumps, and attention called to the faulty points.

Fig. 8 shows a construction in which the width of the water passages of the wheel is the same at the outlet b and the intake c. It would be more correct to so design the

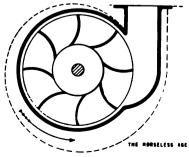


Fig. 9.—Faulty Construction.

passage that the velocity of the water through the wheel passages would be nearly constant. This necessitates a tapered wheel, the width decreasing toward the outlet so as to make  $d \times c = D \cdot b$ . If there is back flow through the passages, dimension b must be made larger than it should be according to this formula.

Fig. 9 shows an incorrectly designed diffuser which extends only over a part of the circumference of the wheel. Only that part of the wheel opposite the diffuser at a certain moment can deliver water, and this pump gives much less water than it could give if the diffuser were made correctly; that is, if it surrounded the whole wheel, as indicated by the dotted line. Owing to the fact that in the rotation of the wheel the part from which water is delivered is constantly changing, a certain amount of power is lost through the inertia of the water which is locked up in the wheel passages not under the diffuser. Theoretically such a pump should give a periodical delivery of water, although the periodicity would be

Fig. 10 shows a design of pump in which the pump wheel extends out into the dif-



FIG. 10.—FAULTY CONSTRUCTION.

fuser. Generally the water flows through the diffuser at a comparatively slow speed, and in high speed pumps this velocity is much less than the velocity of the rim of the wheel. Therefore, the part of the wheel which extends into the diffuser and passes through the water therein with high speed will strongly churn the latter. Correct operation of such a pump is out of the question—it will deliver only a very small quantity of water and consume much power.

The construction of Fig. 10 was probably due to a desire to make the wheel of large diameter and still keep down the outside dimension of the pump. But much better results would be obtained in this respect with a construction similar to Fig. 2, which is used by the author. Here the outside of the wheel comes close up to the diffuser, as ordinarily, but the diffuser is placed over to one side of the wheel. This arrangement insures an easy flow for the water coming out of the wheel, as the passage is bounded on one side by the housing itself.

Fig. 11 also shows an incorrect diffuser, which is not spiral cut concentric with the

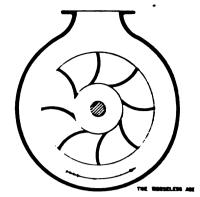


FIG. 11.—FAULTY CONSTRUCTION.

wheel. It is claimed that this construction can be made easier and cheaper, but that is of doubtful advantage here. The passage in this diffuser does not have the form required by the theoretical flow of water, and this involves great loses.

#### A Waste Product as a Dust Layer.

It has recently been reported in sundry newspapers that wood pulp is being used in the making of good roads, and that it has been used with good effect. Inasmuch as wood pulp costs \$18 to \$20 a ton, its use would prove excessively expensive. What is really used is the waste liquor from the sulphite digesters in use wherever paper is made from wood.

For many years the disposal of sulphite liquor has caused much trouble to paper makers. When this substance has been dumped into rivers all kinds of trouble have arisen, in which boards of health and law courts have figured prominently. The liquor contains a percentage of rosin and pitch, cooked in the sulphite digesters from the spruce wood mainly used in the manufacture of wood paper, and this, after being applied to the roads, hardens, forming a binder dressing that will, it is believed, last for months and prevent the dust from blowing from the road.

Experiments in this direction are now being conducted by the officers of the St. Regis Paper Company, one of the largest paper making concerns in the State of New York. These experiments are to determine the adaptability of the waste liquor, as paper makers usually term it, for road making purposes. The liquor is being sprinkled on the roads in the vicinity of De Feriet, N. Y., it being thought such application will solve the dust problem, which, since the advent of the automobile, is more serious than ever. If successful these experiments will turn the waste liquor into a revenue producer, which the officials in question heartily desire may be the case.

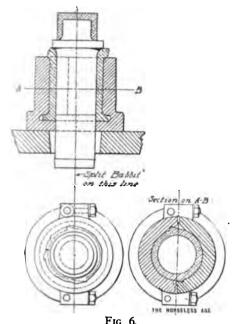
In addition to the experiments at De Feriet the St. Regis Paper Company recently shipped five barrels of the liquor to another part of the State, where it is being tried. The results at De Feriet, while perhaps a little premature, seem to indicate that the top dressing will prove all that is hoped.

### Babbitt Bearings—II.

By S. M. UDALE.

VII. - MACHINING THE BEARINGS.

The babbitt should be cast in cylinders three-eighth inch thick, with an internal diameter three-one-hundredths inch small. In order that the alloy may be consolidated,



of the

and the roots of the keys defined and driven into the main body, these cylinders are placed in a die and a tapered and a straight mandril are driven down successively, leaving the bearing (Fig. 6) from one-one-thousandth to three-one-thousandths inch under size. The bearings are then split by a one-thirty-second inch saw, allowing for which subsequently requires thirty-three-one-thousandths inch in shims between the boxes.

The main bearings are best reamed in place. The keys for the upper halves of these bearings are best trimmed down somewhat, so that they can be rolled out without taking the crank shaft down. The oil holes are usually in the top, fed by a pressure oiler.

The upper crank case should be placed on a horizontal boring machine and a long reamer run through, so that the crank shaft may be exactly true with the axes of the cylinders. The final cut of the reamer should leave the bearing one-one-thousandth of an inch large. To give the proper side c'earance the cap bolts are loosened up and the right distance pieces are placed between the caps. The reamer to cut this clearance is then placed in, and the bolt tightened up so that the reamer just cuts. As the cap is bolted down gradually onto the distance pieces, the table of the machine must be gradually raised. The reamer should revolve in the direction of rotation of the crank shaft (Fig. 7).

The calculations for the size of the clearance reamer and the distance piece are given in the appendix (Fig. 8), together with a discussion by Goodman ("Mechanics for Engineers") on the value of side relief to bearings.

The connecting rod bearings are placed in position, and the connecting rod is securely bolted to the jig shown in Fig. 9, which latter is bolted to the table of a drill press. Reamers are then sent through until the bearings are exactly one-two-thousandths inch over size. The jig is then moved a distance equal to half the thickness of the liners used, to get the requisite clearance (Fig. 7) away from the axis of the drill spindle. Reamers (increasing in size) are then put through until the required side clearance is obtained.

To complete the bearings, and incidentally to test them, they should be spun after the engine is assembled at 700 r. p. m. for three hours, with clean oil in the crank case and the cooling water circulating in the jacket. The spinning should precede the actual engine test, and should be made without gasoline. By having the throttle closed less power is used up and less noise is heard than if the exhaust is into the air. This three hours' driven run will shorten the time that is necessary to properly test the engine, and incidentally eliminate much serious trouble by giving timely warning.

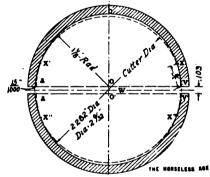
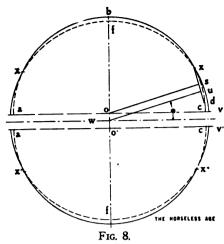


FIG. 7.—SIDE CLEARANCE.

VIII.—LUBRICATION AND OIL GROOVES.

The usual system of oiling the babbitt bearings is to feed the main bearings by a mechanically operated standard pressure



oiler. The oil from these bearings drains down into the lower crank case, where the rapidly revolving crank bearing carries it up to the cylinder walls and to the wrist pin. The oil then drains down the connecting rod and enters the connecting rod bearing by four holes, two-on either side of the web. The result of this method (or lack of method) of oiling the crank bearings is that three times as many knocks are heard from and about connecting rod bearings as about main bearings. In Fig. 9 an arrangement is shown whereby oil is picked up and driven up into the space above the bearing, which device can easily be boxed in with a thin metal cover riveted in between the flanges of the connecting rod. With two holes there would be two reservoirs of oil, but by connecting them together additional security is gained.

The oil grooves in the main bearing should be in the upper half and near the middle. Little or no pressure comes on the upper halves, and the head of oil will always carry it in. The connecting rod bearings should also have an oil groove in the upper half, but low down in the clearance zone. This groove should be on the "on" side, as it has been experimentally shown that the oil is thicker here and the pressure least. As the head of oil available, even with the somewhat elaborate device shown

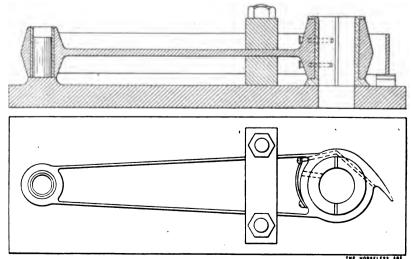


Fig. 9.—Jig for Machining Connecting Rod Big End Bearings.

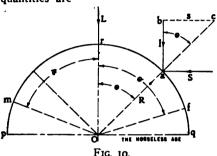
#### THE HORSELESS AGE.

in Fig. 9, is small, this latter point is of importance.

With the non-reversible engines at present running it is extremely bad practice to have oil grooves on both "on" and "off" sides of the bearing. What little oil does go in on the "on" side is promptly squeezed out on the "off" side.

#### IX.-SIDE CLEARANCE.

Let abc represent the semi-circular outline of one of the bearings, and efv the path of the cutter. Let the path of the cutter cut abc in dxx'd'. The known quantities are



$$x v = \frac{\pi}{3}$$
 "= 0.375",  
 $v c = \frac{1300}{1000}$ " = 0.015",  
 $o c = \frac{11}{8}$  "= 1.125",

and the quantities required are

w v = w x = radius of cutter.

w o = w o' =half thickness of liners.

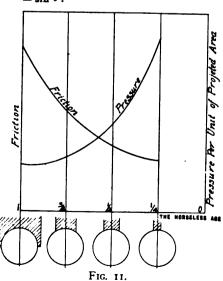
Let s be the mid point of x d and u of xv. Now, os and wu will be perpendicular to the chords xd, xv. Further, the two chords xd, ac of the circle abc meet in v;

$$xv \cdot dv = cv \cdot va$$

$$\begin{cases}
1 \times dv = \frac{15}{1000} \times (2\frac{1}{4} + 0.015) \\
\therefore dv = \frac{8}{3} \times \frac{15}{1000} \times \frac{2265}{1000} \\
= 0.1006'' \\
\therefore x d = 0.274'' \\
\therefore s v = 0.238''
\end{cases}$$

s u = s v - u v = 0.238 - 0.1875 = .0505. $o w = s u \cos \theta.$ 

$$\frac{s \, \nu}{\nu \, o} = \frac{0.238}{(1.125 + 0.015)} = \frac{0.238}{1.140} = 0.209$$
$$= \sin \theta.$$



...  $\cos \theta = 0.978$ ... o w = 0.0517... thickness of liners = 0.103

Again,  $w u \cos \theta + u v \sin \theta = ov = 1.140$   $w u \cos \theta + u v \sin \theta = ov = 1.140$   $w u \cos \theta + u v \sin \theta = ov = 1.140$  $w \cos \theta + u v \sin \theta = ov = 1.140$ 

$$w = \frac{1.101}{0.978} = 1.128.$$

But,  $w v^2 = w u^2 + u v^2 = 1.128^2 + 0.1875^2$ = 1.141".

Hence, the cutter diameter = 2.282, which is slightly over  $2\frac{9}{3}\frac{9}{5}$ , which is 2.28125.

Hence with a cutter one thirty-second inch larger than the crank pin diameter, and with liners one-tenth inch thick between the two halves of the box, the bearing can be backed off  $a_1^1 = (\frac{1}{1000})$  inch at the edge, and tapering back to nothing three-eighths inch from the edge.

THEORETICAL DISCUSSION OF SIDE CLEARANCE.

At a point a on the circumference of a journal of unit radius there is (neglecting friction for the moment) a normal reaction R balancing a portion of the load L, and the side thrust S which produces equilibrium.

The sum of the various products S equals L.

The side thrusts balance among themselves and merely produce friction.

Now  $b = R \cos \theta$ . Let  $\theta^1 = \text{limit of bearing}$ .  $\int_0^{\theta} l d \theta = R \int_0^{\theta^1} \cos \theta d \theta.$ 

Assuming R uniform.

$$\frac{L}{2} = R \sin \theta^1,$$

$$\frac{L}{2 \sin \theta^{1}} = R = \frac{\text{weight}}{\text{projected area of the bearing.}}$$

Actually, R is neither normal nor uniform, although in the middle portion it is very nearly both. Hence the 10° nearest the top r takes much more load than the 10° nearest the points p or q.

It will be obvious that removing the portions q f, p m, which do not take any bearing pressure, relieves the bearing of much side friction, and hence reduces the total friction. The increase in pressure on the remaining bearing is much less in proportion than the decrease of friction.

There is another reason for this decrease in the arc of contact, and that is that the oil is picked up better by the journal, a sharp edge tending to scrape the oil off.

The law connecting the friction with the relief is graphically shown in Fig. 11, and is expressed by the formula

$$F^1 = F \left( 4.7 \frac{\text{Relief}}{\text{Diameter}} \right)$$

where F = friction with relief, F' = friction without relief,

the relief being measured as projected on the diameter at right angle to the load (see Fig. 13).

#### NUMERICAL EXAMPLE.

Using the example worked out above Relief =  $2\frac{1}{4} - 2 \times \text{projection of } x \text{ } w \text{ (Fig. 8)}$ =  $2\frac{1}{4} - 2 \text{ (projection of } w \text{ } u \text{ -- projection } u \text{ } x \text{)}$ 

$$= 2\frac{1}{4} - 2 (1.101 - \frac{8}{18} \sin \theta)$$

$$=2$$
 \(\frac{1}{16}\times 0.209\)

Main Bearing

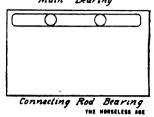


Fig. 12.—Oil Grooves.

$$= 2.250 - 2 (1.101 - 0.039)$$

$$= 2.250 - 2.124$$

$$= 0.126$$

= 0.120  

$$F' = F\left(4.7 - 0.056 \times 0.672\right)$$

$$\log_{4}.7 = 0.056 \times 0.672$$

$$= 0.0376$$

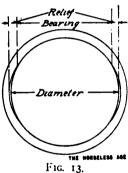
$$F' = F \times 1.090$$

F = 91.8 per cent. of F'

Hence friction is reduced by 8.2 per cent. Pressure is increased by 5.6 per cent.

### Elliptic Gearing for Magnetos.

A writer in an English contemporary (Motor Trader) suggests the driving of magnetos through elliptic gears to produce a more effective spark. It is well known that the maximum electromotive force induced in the armature of a magneto de-



pends upon the speed with which the lines of magnetic force are cut by the armature conductors. This speed is limited because in a four cylinder, four cycle motor two sparks are required per revolution of the crank shaft, and as the conventional magneto produces two sparks per revolution of its armature, the latter must be geared to turn at the same speed as the motor, which is very slow for so small a machine. By employing a pair of elliptic driving gears. which give a periodically variable motion. the armature could be considerably accelerated at the time the maximum induction occurs in it, whereby the electromotive force would be considerably increased. The strains of acceleration and deceleration of the armature would have to be counted with, but where the armature has only a low tension winding this may not be a serious objection.

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### Theft of Equipment from Transient Cars in Garages.

A writer in our Communication Columns this week complains of the loss of articles of equipment from his car at various garages at which he put it up while touring. That such things as tools, clocks, pumps, jacks, etc., are not safe from theft when left on a car in the average garage is a well known fact, and various systems have been devised with the object of protecting regular customers. Transients, however, do not seem to have received much consideration in this respect as yet. Where the touring party is accompanied by a chauffeur, as is quite generally the case at present, he may be directed upon arriving at the garage to take off all parts not riveted down, and place them in a locker over night. The tourists themselves, however, if they travel without a chauffeur, can hardly be expected to do this, for upon arriving at the night stopping place they are usually tired and hungry and long for a bath more than anything else. A tedious taking down of parts not safe from theft, and the remounting of these same parts the next morning, would certainly detract much from the pleasure of a tour.

#### THE HORSELESS AGE.

The ideal way to avoid such annoyance to tourists is to provide individual stalls in garages into which transient cars may be run upon arrival, the key being kept by the owner until he wants his car again. Some of the newer garages in the big cities are arranged in this way. The plan would seem to have much to recommend it, particularly for garages catering to the tourists' trade, as with a constantly changing patronage the opportunities for stealing equipment are greater than in the average garage.

To the garage owner these complaints about articles having been stolen from the car must be extremely annoying, and if he knew a ready way of obviating the thefts he would certainly apply it. But the only effective remedy is the radical one of separate stalls. These, we have no doubt, will be supplied if demanded by patrons.

#### Grade Crossing Accidents.

Accidents to automobilists at grade crossings have been alarmingly numerous of late, and have generally resulted fatally. The abolition of grade crossings is making very slow progress, and it is really imperative that steps should immediately be taken to render the crossings safer by means of better warning signs. We have pointed out in these columns before that the present crossing signs do not fully serve the purpose from the standpoint of the motorist. They are too close to the track, and, besides, are generally not conspicuous enough.

It may be said that the driver is generally to blame for such accidents; that they can only happen if he does not exercise the necessary care. If the driver always kept a watchful eye on the road ahead and never exceeded the legal speed limit, these grade crossing accidents would probably be almost unknown. The frequency with which such accidents occur shows that drivers are wont to relax their attention on occasion, and this fact must be calculated with.

We believe that signs to warn automobilists of railroad crossings should be placed about a quarter of a mile ahead of the crossing, should be made as large as possible, painted in sharply contrasting colors and made to project a certain distance over the road, so it would be practically impossible to miss them. At night the signs should, of course, be properly illuminated. If such warning signs were erected at all crossings many fatal accidents might be prevented.

#### The Status of Aluminum.

It seemed a short time ago as though aluminum would be the standard material for all enclosing cases used in automobile construction. Ouite recently, however, there has been a considerable reversion to gray and malleable iron cases for the more important parts. These latter materials are more commonly used for crank cases than for other parts, though there are a considerable number of change gear cases and a few steering gear housings in which it is used.

There appear to be two important reasons why little or no aluminum is used in some of the recent cars. The tendency recently has been toward lower prices and economy in construction, and although aluminum is considerably cheaper than formerly, cast and malleable iron have also become cheaper. A cast iron case is probably always cheaper than an aluminum one, and a malleable iron case nearly always so, notwithstanding that the aluminum can be used nearly as thin as the other metals, is much lighter for a given bulk, and can be machined faster.

But while the lower prices of cast and malleable iron have favored their adoption, probably the most important consideration in many instances has been their greater reliability. Aluminum appears to be a metal whose qualities are largely affected by its impurities, a slight increase in their percentage making the casting liable to break under stresses much less severe than the usual tensile strength of the metal would lead one to expect to cause trouble. Some of the aluminum bought from the smaller foundries has proven weak, and this has affected the reputation of the metal generally. The larger foundries have, as a rule, given the trade most excellent metal, as they were enabled by quantity production to employ competent men to watch the entire molding process carefully. Excellent aluminum castings are also made in the foundries of some of the larger automobile manufacturers. It is earnestly to be hoped that the recently formed combine of aluminum manufacturers will standardize the manufacture of this metal to such an extent that it will acquire the uniformly good reputation which the many excellent qualities of properly cast aluminum deserve.

We also hope to see the production of the metal from its ores greatly cheapened so that even when it is given the necessary careful handling in the foundry the castings can profitably be sold at a much lower price than at present. Probably the impending manufacture of aeronautical devices will stimulate the study of the production of aluminum and its alloys, for the benefit of all classes of users.

#### Cast Steel Flywheels.

The flywheels of automobile motors have been until very recently almost universally of cast iron, but within a short time steel castings have been largely adopted for this purpose.

The main considerations in the design of a gasoline motor flywheel are twofold—the attainment of a maximum storage of energy in the rotary form, per unit of wheel weight, and the embodiment of a sufficient factor of safety to render practically impossible the bursting of the wheel under the action of centrifugal force.

A pound of metal incorporated in a flywheel is of value, so far as its storage of energy is concerned, in proportion to its distance from the axis of the shaft. The peripheral speed of a cast iron wheel is, however, strictly limited by the tensile strength of the material, and the maximum angular velocity being fixed by the characteristics of the motor, the maximum wheel diameter is thus definitely restricted.

In ordinary machine design the maximum safe peripheral speed of a cast iron flywheel is usually taken at about 6,000 feet per minute, a factor of safety of approximately ten being thus allowed.

For small wheels with solid webs, as used in automobile practice, this maximum safe speed is often taken as high as 7,500 feet per minute.

As the average modern automobile motor is capable of "racing" at as high a speed as 2,000 revolutions per minute, a cast iron wheel of slightly over 14 inches in diameter is as large as is usually permissible. A very wide and often quite a thick rim is therefore generally necessitated.

The greater tensile strength of cast steel (approximately three times that of cast iron) allows a much greater maximum peripheral speed to be employed, with no corresponding reduction in safety, or the same peripheral speed to be maintained and greatly increased security attained.

If the former alternative is chosen a considerable increase in diameter becomes permissible, the angular velocity remaining the same. The effectiveness of each pound of material in the wheel rim is thus increased, as stated above, and a wheel of given

steadying capacity can thus be produced of less weight in cast steel than in cast iron.

Wherever considerations such as road clearance and centre of gravity permit it would seem that the use of cast steel flywheels of somewhat larger diameter than the cast iron ones now in general use might be advantageous in the interest of weight reduction, despite the somewhat increased cost involved. A liberal increase in the factor of safety of such wheels could be made, and sufficient advantage in increased lightness still be secured.

In this connection it may be noted that flywheels with steel wire wound rims have been used for some time past by at least one automobile manufacturer in order to obtain the same advantages above noted as appertaining to the use of steel castings.

This tendency toward the adoption of steel in place of cast iron is simply one more of the many changes which have lately characterized the automobile industry, all of which are in the direction of a selection of the best adapted material for each particular application.

#### Renewed Interest in Carbon Steels.

When the use of alloy steels became common in automobile construction many designers apparently allowed their admiration of the qualities of some of the more expensive metals to get the better of their common sense. At least they used these alloys for many parts which would have been just as good if made from cheaper materials.

The recent trend toward lower priced and lower powered cars has forced makers of this class of vehicles to again employ a good grade of carbon steel for most parts. These steels first began to come into general use again as the material for sliding gears. Being found to give good service, with motors of moderate power, for these troublesome parts, the carbon steels have gradually been adopted for practically all the parts of the smaller and lower priced machines. Most makers have been forced by a consideration of the question of cost to investigate these steels, and have found that those makers who adhered to them all along have had comparatively little trouble.

So far as our knowledge of the materials being used in the cheaper cars goes—and it includes quite a number of machines—carbon steels, with rather high manganese and low sulphur and phosphorus, are used, except in a few places where especial compactness and strength is desired. These

special parts are usually made from chrome-

These changes in material are in line with the production of sensible machines for ordinary uses. But for cars of high power, or for users who wish extremely light machines and are willing to pay the price, the more expensive alloy steels will still continue to be used to a considerable extent.

It is unfortunate, however, that some few makers are apparently paying little attention to the quality of material they are using, and are making parts from metal containing enough sulphur and phosphorus to make it brittle and uncertain. Perhaps they are looking for present dividends rather than for future business.

# The Increasing Number of Agencies.

The development of the automobile business during the past few months is most noticeable to the average observer through the increase in the number of makes of cars handled in his home city. This is particularly true of the larger cities of the West and Middle West. Heretofore only a few of the larger manufacturers have been able to maintain agents in all the principal cities of this section, but from the number of agency contracts which are being closed for next season it is evident that even the companies of secondary size will be represented in most of the principal cities during 1910. Even agencies for makes which are not well known to the general public are cropping up here and there, and some of the so called next season's models are already being exhibited. During the coming year purchasers will evidently not be obliged to go very far from home to get almost any make they may wish.

#### Coming Events.

September 6-11—Lowell (Mass.) Annual Motor Carnival, Lowell A. C.

September 10 and 11—Motor Car Racing Association of Maryland Meet, Baltimore, Md.

September 11 and 12—Endurance Run from Philadelphia to Cape May and return. The Motor Company, Philadelphia, Pa.

September 15—Denver (Col.) Start of Flag-to-Flag Race to Mexico City, Denver M. C.
September 21—Riverhead L. L. N. V. Motor

September 21—Riverhead, L. I., N. Y., Motor Contest Association Meet.

October 7—Philadelphia (Pa.) Second Annual 200 Mile Stock Chassis Race in Fairmount Park, Quaker City M. C.

November 6 to 13—National Automobile Show under the auspices of the N. A. A. M. at Atlanta, Ga.

December 29.30—Philadelphia (Pa.) Annual Midwinter Endurance Contest Quaker City M. C. December 31 to January 7—New York City Annual Show, Grand Central Palace, American Motor Car Manufacturers' Association.

# Maintenance and Repairs



# Useful Points from Driving Experience.

By A. D. HARD,

Small particles of foreign matter getting on the surface of the contact roller of the timer will often cause irregular missing of a perplexing nature, or irregular current passage which will result in lack of power from that particular explosion, causing a jerky action of the motor. To remedy this condition hold the contact roller against a revolving emery wheel at a slight angle from its natural path and the surface will become bright and smooth in one minute.

The points of a split pin may be made to stay snugly together for reinsertion by slightly spreading them with the point of a knife blade inserted near the shank, and then pinching the points together with the pliers. When the knife blade is removed the points will hug each other beautifully.

In testing dry cells when connected up never place the instrument directly upon the carbon. It is not a good conductor, and will mislead. The better way is to see that the nut on the small brass bolt through the carbon is tight, then connect to that. If the bolt is loose the cell will not test up to its proper amperage. If the connection is doubtful, test by touching the carbon point of the instrument to the zinc of the next cell following.

The water jackets of cylinders which have been cracked by freezing of the cooling liquid until they leak may be quickly and cheaply repaired by screwing on a thin piece of metal plate made to conform to the shape of the cylinder with a piece of ordinary steam packing underneath. (This would not be a particularly neat repair.— Ep.)

An otherwise unexplainable knocking may be due to a new connecting rod bearing which is not exactly true. The effect will be to throw the piston against the side of the cylinder at each explosion.

Overheating at high speed of the motor when running on low gear may be greatly reduced by putting the spark well ahead and slowing the motor speed as needed by the throttle. This cuts down the amount of fuel used and consequently the heat units produced.

Some forms of carburetor have two springs on the supplementary air inlet, one being a soft spring which will hold the air inlet closed with but little force in order to make the motor start easily. The other spring is a much stiffer spring which should not exert its force until the energetic suction of high speed renders the softer spring useless to draw sufficient fuel for the more rapid action. Tightening up the soft spring gives more fuel at slow speed, tightening up the stiffer spring increases the fuel supply

at high speed. A popping noise in the carbuhetor is a call for more fuel.

A pressure gauge upon the pump is a very uncertain way of determining the air pressure in a tire. The resistance to the ingress of air is added to the tire pressure in such a gauge. The gauge should be applied to the valve opening after the pump is removed.

A small amount of lubricating oil mixed with the gasoline will improve compression and be an insurance against failure of the regular lubricating mechanism, but too much oil in the gasoline will interfere with the proper action of the carburetor. In my opinion one half pint of thin lubricating oil in 5 gallons of gasoline is sufficient for best results.

An old inner tube which has been patched until it is unreliable may be slit open around its concave side and placed over a new inner tube with great advantage to the life of the new inner tubes.

The only safe way to crank a motor is to have the compression and ignition come while the crank is being pulled up. It does not make any difference which hand is used. Safety depends upon having the resistance against the flexed fingers, so that if a back kick comes it will simply pull the hand open and do no harm. Directions for using the left hand instead of the right are misleading, in so far that if you push down with your left hand you are liable to get your left arm broken.

A switch on the steering wheel by means of which you can cut out the ignition when rounding corners, coasting and passing pumps, is a valuable little addition to a car.

### Truing Up a Brake Drum. By A. P. Press.

Perhaps there is no part of a car the dependable operation of which is so conducive to that cool nerve which is so essential to good driwing as is a good brake—a brake that will hold when wanted to, and will let go when the pressure is relieved. If the brake drum is "out of true" no brake will "feel" good, and the object of the present article is to show how the drum can be made to run true.

If the drum is made integral with the hub casting, as it is in some of the smaller cars, it can only be trued in the lathe, which is a machine shop job, but if it is bolted to the spokes it can be made to run as good again as when it left the wheel maker's, and perhaps better.

Jack up the car at the side where the drum is out, so the wheel can be taken off and the drum removed. Put the wheel back and put the wheel nuts on. Take the wheel and true off the seat where the drum goes. This can be done by using a rest and a sharp chisel. It will take two persons to do this, one to turn the wheel and the other to hold and use the chisel, the same as in wood turning.

The spokes being faced off, take off the terested in the great modern problem wheel and put on the drum with two small marketing goods should procure a copy.

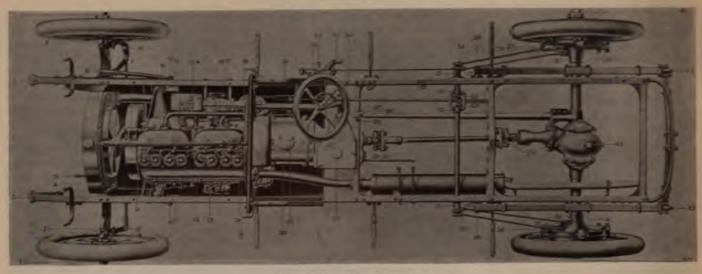
bolts. That is, if the wheel bolts are threeeighth inch use a five-sixteenth inch bolt and tighten as hard as you can, and still move the drum with a smart blow with a wood mallet. Put the wheel back on the axle and turn it the same as you did in truing off the spokes, holding a piece of chalk on the outside of the drum, if the brakes are of the contracting type, or inside if they are of the expanding type. Strike on the high side with the mallet to knock the drum true, and try with the chalk again. Continue in this manner until the wheel runs perfectly true, and tighten the two bolts very tight. Now, take a twist drill or a reamer the size of the wheel bolt (don't try to use a carpenter's bit) and ream out each hole true with the hole in the drum. The drum being of metal, it will guide the reamer to cut the hole in the spoke true with itself. Now take the wheel bolts and put them in, taking care to put them in opposite to each other, and to tighten them equally hard. Put in four bolts in this manner, and then ream and put in the other eight bolts. If the bolts are all too large to fit the holes dip them in white lead. This will make them hold and also stop them from rusting. A drum can be trued in this manner to within 1-100 of an inch, which is near enough for all practical purposes.

#### The Asbestos Industry.

According to a brochure just issued by the United States Geological Survey the United States leads all other countries in the conversion of raw asbestos into manufactured products, although much less than I per cent. of the material used is mined in this country. There are only two active mines in the United States at present, one in Vermont and one in Georgia, although asbestos is found also in the Grand Canyon of Arizona, in Wyoming and in California. Canada is the greatest source of raw asbestos, which is imported duty free for the manufactories of the United States. Canada's production for 1908 amounted to 65,-534 tons, of a value of \$2,547,507, while the total output of the United States during that year was 936 tons, valued at \$19,624. Imports of unmanufactured asbestos into the United States in 1908 amounted to \$1,-068,322, and manufactured \$127,548. Russia has recently become an important producer of asbestos, her 1907 production being 10,308 tons.

#### Address on Advertising and Selling.

The address on advertising and selling delivered by Hugh Chalmers, president of the Chalmers-Detroit Company of Detroit, Mich., before the Associated Advertising Clubs at their recent Louisville meeting, has attracted the widest attention because of the unusual amount of practical sense and worldly wisdom that was packed into a short talk. The address will no doubt appear in pamphlet form, and anyone interested in the great modern problem of marketing goods should procure a copy.



STEVENS-DURYEA CHASSIS.

			Give	1224	No. of Places on
No.	Parts.	Lubrication.	Attention.	Miles.	Chassis.
1	Front hubs			1,000	2
2	Steering knuckles			200	2
3	Springs			***	2
4	Carburetor primer			7000	1
5	Starting handle			****	- 3
6	Steering sod	Oil	Every day		2
7	Fan support			300	
8:	Tie rod	Grase	*** *****	200	2
2	Fan bearings			2000	1
10	Springs	Oil	Every day	****	2
11	Springs			****	2
12	Valve tappets			****	8
320	Rocker shaft and connections	Oil	*** ******	300	4
13	Magneto	Oil (light)	*** *****	500	2
14	Magneto connection	Oil	Every day	****	1
15	Magneto bearings	Grease	*** *****	200	1
16	Steering post	Grease		750	1
17	Timer	Oil	Every day	****	1
18	Steering post	Oil	*** *****	200	I
19	Clutch bearing and brake pedal	Oil	*** *****	200	2
20	Clutch bearing	Oil		200	I
21	Clutch ring	Oil	*** *****	500	1
22	Gear shift lever				1
23	Emergency brake lever	Oil	Every day	****	1
24	Transmission	Oil (heavy 1 is	nch		
		deep in case	)	2000	
25	Torsion rod spring	Oll.,,,,,,,,	*** *****	200	1
26	Torsion rod bearings	Grease		300	1
27	Torsion rod hearings	Grease		300	1.1
48	Ball joints	Oil	*** *****	200	2
20	Universal joints	Grease,,	*** *****	250	.2
30	Sliding Joint (Universal)	Grease	**** ******	250	1
31	Brake bearings	Oil		200	2
32	Brake rods	Grease	*** ******	300	2
33	Brake equalizer	Oil	*** *****	300	2
34	Brake rod ends	Oil.,	*** *****	200	2
35	Brake rod ends	Oil	*** ******	200	2
36	Springs	Oil	*** *****	200	2
37	Brake arm bearings	Grease	or Lane	200	2
38	Brake rod arm ends (upper and lower).	Oil.,,,,,,,,	*** *****	200	4
39	Brake rod ends			200	2
40	Rear hubs	Grease		1,000	2
4.1	Spring seats	Grease		200	2
42	Rear axle	Oil (heavy) t	0		
		overflow		750-	
43	Springs	Oil	Every day	1111	2
			-		

#### A Practical Oiling Index.

The above table represents a double page from the new instruction book issued by the Stevens-Duryea Company, of which a copy has been received at this office. This double page contains complete instructions for oiling all parts of the car. The nlan view of the chassis shows all parts that to be oiled, properly numbered, and

the lettering on the chart gives the name of the part thus indicated, the form of lubricant required by it, the frequency of attention required and the number of similar points on the chassis. This form of oiling index seems to be very practical, and may be recommended as a guide to others whose duty requires them to prepare instruction books.

### American Expositions in Germany.

Two expositions of American manufactures are to be held in Berlin next year. One of them is known as the American Exposition, Berlin, 1910, and will be held during the three months-April, May and June. An American office has been established in the Hudson Terminal Building, 50 Church street, New York, and Max Vieweger is American manager. According to German custom on such occasions, an honorary board of directors has been appointed, and Prince Henry of Prussia has accepted the presidency of the exposition, while J. Pierpont Morgan and Thomas A. Edison have joined the honorary American committee. We are informed that the two large German transatlantic lines offer a reduction of 30 per cent. on freight intended for the exposition. Arrangements have also been made whereby exhibitors who do not want to send a man specially to Berlin can have their exhibits unpacked, installed and demonstrated, for a moderate charge, by a special sales office and Bureau of Information established in the Exposition Building.

The other exposition referred to is known as the American Permanent Sample Exhibition at Berlin, and is conducted by the American Exhibition Company, 77-79 Broad street, New York. This exhibition, which is to be opened in the spring of 1910, is designed primarily as an exhibit of distinctively American products, and the management especially desires American manufacturers of novelties to take part.

#### Triumph of the Taxicab in London.

Vice Consul General Richard Westacoff reports that in a written reply by the British Home Secretary to a recent question the rapid rate at which the horse drawn cab is giving place to the taxicab in London was strikingly indicated. The number of licensed hansom cabs on July 1 was 4,039, a decrease of 1,290 in one year; four wheeled cabs, 3,379, a decrease of 389; motor cabs, 3,394, an increase of 1,886. It will thus be seen that in one year the number of taxicabs has more than doubled,

# NEW VEHICLES

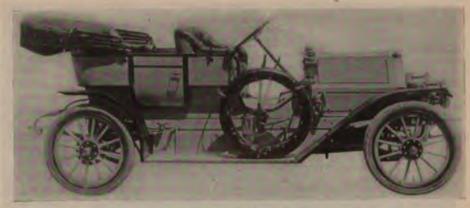


The Badger Car.

In our last week's issue we gave the specifications of the car to be turned out by the recently organized Badger Motor Car Company, of Columbus, Wis., and we are now enabled to print a photograph of the car, complete, and a side view of the chassis. The vehicle is equipped with a four cylinder Northway motor of 4 inch bore and 4 inch stroke. The motor, clutch and change gear are assembled into a power unit, which is carried on a sub-frame. The cooling water is circulated on the thermo-siphon principle, and a flat belt driven circulating fan is located back of the radiator, carried by a self adjusting bracket secured to the forward engine cylinder. The carburetor is a Schebler, and is located on the left hand side of the motor, connecting through a two branch manifold to the inlet ports. A Bosch high tension magneto is fitted for ignition, and the spark plugs are located over the inlet valves. The motor is lubricated by splash, an oil reservoir being provided at the bottom of the crank case, and the oil kept in circulation by a pump. The spark time is fixed, and there is consequently no spark lever on the

The clutch is designed to run dry, but the clutch operating mechanism and the change speed gears operate in a bath of oil. The gears of the change gear are forgings made from open hearth steel. The shafts of the change gear are carried in F. & S. ball bearings. The drive to the rear axle is by a shaft encased in a tube, which acts as a torsion brace. There is only a single universal joint in the drive to the rear axle, at the forward end of the propeller shaft.

The frame of the car is of pressed steel and is very slightly narrowed in front. It is carried by semi-elliptic springs in front and three-quarter eliptics in the rear. Particular care has been exercised



BADGER CAR.

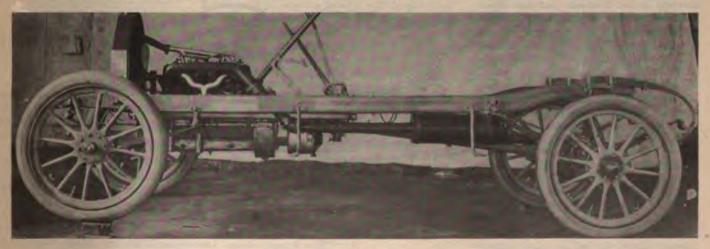
in the design of the spring joints. The spring eyes are fitted with bronze bushings, the spring shackles and bolts are case hardened, and all of the spring joints are provided with grease cups. The rear axle is of the semi-floating type, and of such design that the universal and driving gears may be removed without taking the axle apart. The front axle is a one piece drop forging of I section, with Elliott type steering heads. The steering gear is of the worm and gear type, and the tie rod is located back of the axle. Two independent sets of brakes act on drums secured directly to the rear wheel hubs. These brakes are of the internal expanding and external contracting patterns, respectively, and the braking action on the two drums is equalized by means of pressed steel balance levers extending all across the frame.

The control devices are arranged along conventional lines. There are the usual change gear lever and emergency brake lever just outside the driver's seat, the inclined steering post, clutch and service brake pedals, and an accelerator pedal, and a throttle finger lever on top of the steering column. The change gear is controlled on the selective plan, and its enclosing housing is relatively compact. The car will be seen to conform generally to current conventional practice and forms one of the many "Thirties" which this season has brought forth.

#### Pressed Steel Automobile Parts.

The first part of automobiles to be made of pressed steel was undoubtedly the running gear frame, and this particular important part is now almost exclusively made by this manufacturing process. Before pressed steel frames came into use motor car frames were made either of angle steel or of wood reinforced with sheet steel flitch plates. As compared with the angle steel frame the pressed steel frame was undoubtedly stronger for a given weight, and it also was much sightlier. The possibility of varying the height of the section along the length of the frame member in accordance with the variation of the bending moment afforded a striking theoretical advantage, but we are inclined to think that the smoother finish and generally superior appearance were the chief cause of victory of the pressed steel over the structural steel frame.

With the comparatively recent advent of automobile production on a very large scale has come an interest in the production of other parts than the frame members from pressed steel. Pressed steel rear axle housings are now used to a considerable extent. Unless we are mistaken this construction originated with the Fiat Company, who introduced it when they brought out their first light car about two years ago. The Fiat axle consists of two pressed steel halves which are bolted together. Since that time the autogenous welding process



CHASSIS.

ning must be renewed after fifty to rings.

e Duryea Delivery Wagon.

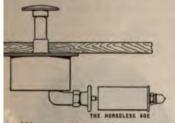
show herewith a cut of a light delivigon built by Charles E. Duryea, of ig, Pa., using his two cycle air cooled and his simple friction roller drive. The two cylinder, 15 horse power is placed at the rear just in front of

The two cylinder, 15 horse power is placed at the rear, just in front of ar axle. The spark plugs are easily d from the sides. The timer is just it of the rear axle. The whole power an be dropped off of the chassis in minutes, it is claimed. The hot pass to the rear without scenting the and the inclined position of the cylcontributes to easy cooling. Fans ted if the service is very hard, but rily this is said to be not needed. eight is well to the rear, so the rear re not torn by slipping wheels. The nd battery are under the seat of the leaving the entire body of the veor goods. This seat is at the front, the major portion of the body for d. It is evident that the seat can ed even further forward, and to give coom in the body of the vehicle for

Further, if necessary the tank can ried under the floor and the seat for loading and unloading at the end. This prevents loss by theft, the rear door can be kept closed. perator saves time by not being to go to the rear for every little. The weight of the car is 1,200

#### Wordingham Foot Horn and Auto Signal.

Wordingham Foot Horn Company, errill Building, Milwaukee, Wis., have upon the market a dashpot device



TE WORDINGHAM AUTO SIGNAL.

erating automobile horns, and also an ignal. The dashpot device consists ard brass cylinder of 27 cubic inches y, which is fixed underneath the foot-

The cylinder will stand a pressure in 100 to 150 pounds a square inch, a device is operated by the heel of ver. The dashpot, of course, takes ce of the ordinary rubber bulb, and ned to be more reliable and durable, tion it can be operated with the foot, accessible under all conditions, which the case with the rubber bulb in the ocation outside the seat. The dashmects with the horn tube by means andard thread, and will fit any horn



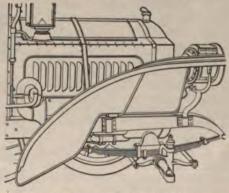
BUGGYAUT DELIVERY WAGON.

tube. The tube runs underneath the car, and only the horn is outside the car.

The Wordingham auto signal consists of a combination of the brass dashpot just described and an all-brass two toned whistle. The whistle is directly connected to the dashpot, and the entire device is secured underneath the footboard. The whistle can be adjusted to any tone, and then locked. Simplicity, good wearing qualities, low cost and independence of engine are claimed to be the chief advantages of this signal.

# The B. & L. Trailing Steering Spindle.

A steering knuckle so constructed that the centre line of the hub spindle does not intersect the centre line of the pivot pin, but lies a certain distance back of it, is being exploited by the Queen Manufacturing Company, of Webster City, Ia. It is claimed for this construction that in case the connection to the steering post should break the steering wheels will keep in the straight ahead position long enough to al-



THE B. & L. FRONT AXLE TRAILING SPINDLE.

low the driver to stop the car. The distance between the centre lines of the vertical and horizontal spindles is 2½ inches. The company owns patents issued January 9, 1901, and November 1, 1898, which are claimed to cover the construction. We understand that negotiations are now pending with the Mason Motor Car Company, of Waterloo, Ia., with respect to the use of the device on Mason 1910 cars.

Harvey Auto Springs.

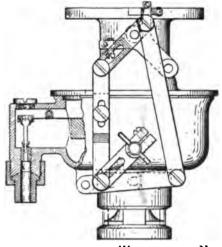
The Harvey Spring Company, of Racine, Wis., have entered the field with a line of automobile springs, comprising semi-elliptic, full elliptic and scroll and elliptic types. The semi-elliptic springs are furnished, as a rule, with rebound clips, and either with

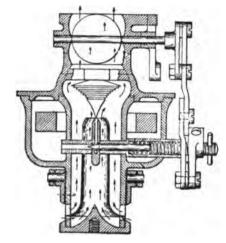


HARVEY AUTOMOBILE SPRING.

or without a centre bolt. Where no centre bolt is used the plates are held together with a clip in the centre when shipped, while when in place on the car they are held together by the regular axle clips. In place of the usual bolt there is a small bead in each plate that fits into a depression in the plate below to keep the plates from shifting. It has been found that one of the weakest points of the ordinary spring with a centre bolt is at the centre, and the boltless construction considerably increases the strength.

The scroll end elliptic springs are used





WACKENHUTH NON-SPRAYING CARBURETOR.

in place of the regular full elliptic type. These springs are claimed to ride easier on account of the extra length of the upper half.

### The Wackenhuth Non-Spraying Carburetor.

The Wackenhuth Carburetor Company, 26 Hackett street, Newark, N. J., manufacture a carburetor in which the stream of gasoline issuing from the nozzle is spread over a cone a portion of whose surface is serrated. The carburetor is of the concentric float type, and constancy of mixture is assured by means of a needle valve in the passage to the gasoline nozzle and a sliding sleeve which obtrudes the air openings more or less. The sliding sleeve, gasoline needle valve and throttle valve are interconnected by an adjustable linkage. It is claimed that the gasoline is spread evenly over the surface of the cone in a very thin film, and the air in passing the surface of the cone absorbs the gasoline, whereby a uniform mixture is produced. In order to adjust the linkage connecting the throttle valve with the gasoline needle valve and the air inlet valve, the engine is first run



CHAMPION AUTO ENGINE CLEANER.

on small throttle at slow speed, and the needle valve is adjusted to the proper position for these conditions of running. Then the engine is run on open throttle at full speed and under full power, and the needle valve is again adjusted to the position in which it gives a correct mixture. Then the linkage is so adjusted that it will bring the needle valve to the correct positions for both low and high speed operation. The manufacturers especially recommend the carburetor for use on two cycle motors, and claim that it will prevent back firing into the crank case.

#### The Champion Auto Engine Cleaner.

The Lennox Chemical Company, of Cleveland, Ohio, are manufacturing an outfit designed to facilitate the cleaning of automobile engines and other greasy and dirty machine parts. It consists of a seamless galvanized steel tank, with a gauge and safety valve, a spray nozzle with strainer and cock, and a length of flexible metallic tubing to connect the spray nozzle with the tank. The outfit is furnished with one of two sizes of tanks, of six and eight gallons capacity respectively. When it is to be

used the tank is filled half full with gasoline, and compressed air at a pressure of 80 to 120 pounds per square inch is admitted to the upper portion of the tank through the gas inlet provided for the purpose. The air can be obtained from the tire inflating installation found in most garages When the gauge on top of the tank shows the desired pressure, the inlet cock is closed and the nozzle cock opened, whereupon the sprayer may be put to use. It is customary to work from the top of the engine down. It is claimed that the high pressure stream of gasoline cuts and dissolves the caked grease and dust on the engine and cleanses the engine thoroughly. By means of the sprayer all parts of a car can be conveniently reached. It is

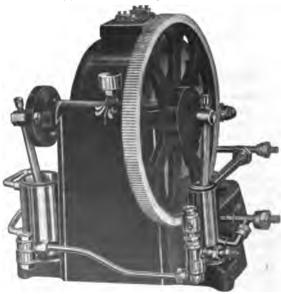
open air, and users are warned to guard against a hot engine, lighted lamps, cigars, etc. Kerosene or soap suds can be used instead of gasoline, if desired. The use of the outfit is said to result in a great saving in gasoline as compared with the usual method of applying the liquid in cleaning greasy parts. It also greatly expedites the cleaning process. This cleaner is handled by the Bishop & Babcock Company, Cleveland, Ohio.

# The Eureka Automatic Compound Air Pump.

This is a new electric air pump recently placed on the market by the Bishop & Babcock Company, of Cleveland, Ohio, for the use of public and private garages. The pump is known as the No. 12, and is claimed to automatically maintain a constant air pressure of 100 pounds, or less if desired. Pumping into an 18 gallon tank, the pump will furnish enough air to inflate one tire per minute, and the capacity of this pump is said to be sufficient for the largest garages.

The construction of the pump is well shown by the illustration. The electric motor is back geared to give a low rate of revolutions of the countershaft. The countershaft carries a crank pin at each end from which the low pressure and high pressure pumps are operated. The pump cylinders are secured to the base of the electric motor. The pumps are made entirely of bronze, and have bronze valves and connections.

The pump is controlled by an automatic switch, illustrated by one of the cuts, so it will operate only when the pressure in the tank is below that for which the switch is set. The pump will fill an 18 gallon tank to 25 pounds pressure in three minutes; 50 pounds pressure in eight minutes; 75 pounds pressure in twelve minutes and 100 pounds pressure in sixteen and one-half minutes. The pump cylinders are of 1½ inch and 2½ inch bore, respectively, and both pis-

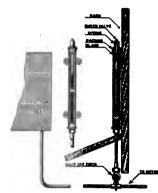


recommended to use the outfit in Eureka Automatic Compound Electric Air Pump.

tons have a stroke of 3 inches. The motor is either a one-third horse power alternating current motor or a one-quarter horse power direct current motor. The countershaft turns at 150 r. p. m.

#### The Hub Tank Gauge.

This gauge, which is manufactured by H. W. Hubbard, Middletown, Conn., consists of a heavy glass tube enclosed in an outer metal sleeve, cut away in front to show the level of the liquid, and held in position by gaskets to make a liquid tight joint and absorb all vibration which might



HUB TANK GAUGE.

have a tendency to break the glass. The lower end of the metal sleeve is connected, by suitable tubing containing a shut-off cock, to the pipe line to the carburetor, the gauge being placed in any convenient location, as on the dashboard.

The special feature of the gauge is a loosely seated check valve in the top of the metal sleeve, over the gauge glass, which allows the air contained in the glass tube to escape slowly, but in case of violent jolting closes and prevents spilling of gasoline.

### Packard Company Reorganized With Increased Capital.

The Packard Motor Car Company, of Detroit, was originally started some eleven years ago as a West Virginia corporation. It became a Michigan corporation September 1, 1909. In reorganizing the company under the Michigan laws, the capital stock became \$5,000,000 preferred and \$5,000,000 common. The enlargement of the capital stock is made to meet the company's needs for enlargement of floor space and additional facilities generally, in order to enable the company to avoid night work.

# Overland Company to Increase Capital Stock.

According to a report from Toledo, Ohio, the officials of the Overland Automobile Company are completing a plan of reorganization of the company. The present company is an Indiana corporation, and is capitalized at \$800,000. The acquisition of the Pope plant in Toledo made it necessary to considerably increase the amount of capital, and it is said to be the intention of the officials of the company to give up their Indiana charter and to reorganize under

the name of the Willys-Overland Company, with a capital stock of \$2,000,000.

The company plans to turn out 16,000 cars next year, of which 10,000 are to be manufactured in Toledo and the rest in Indianapolis. The new Overland model will be of 20-24 horse power, and will be provided with two, three and four passenger bodies. At the present time considerable new machinery is being installed in the Toledo factory to facilitate the rapid production of cars. Mr. Willys, president of the Overland Company, is said to be endeavoring to induce T. W. Warner, of Muncie, Ind., formerly of the Warner Gear Company of that city, to locate in Toledo. Mr. Warner is organizing the Warner Manufacturing Company, for the manufacture of change gears, and it is stated that Detroit and Muncie are making bids for the plant.

# H. E. Wilcox Motor Car Company Increases Capital.

The H. E. Wilcox Motor Car Company. of Minneapolis, Minn., has been reorganized with a capital stock of \$1,000,000. It is understood that the company will be continued as a closed corporation. John F. Wilcox, father of H. E. Wilcox, and C. H. Davidson, of Carrington, N. Dak., it is stated, will supply most of the additional capital. Work is to be started at once on a new four story brick factory building, 300x80 feet, at 1030 Marshall street N. E., adjoining the present plant of the company. Next year 1,000 cars are to be built. P. W. Strong, sales manager of the Welch Motor Car Company, Pontiac, Mich., will join the Wilcox Company. At present the company employs only about fifty men, but after the completion of the new building it will give employment to about a thousand, as it will then manufacture most of its own parts, instead of merely assembling parts of cars bought in the market.

# Middleby Company to Produce a Six Cylinder Car.

The Middleby Automobile Company, Reading, Pa., are to bring out a six cylinder machine about October 1, with 120 inch wheel

base, 36x4 tires and 40 horse power motor. The car, fully equipped, including top and wind shield, will sell for \$2,000. It will be made as a roadster or a touring car as desired. During 1910 they expect to turn out 350 cars, having a brick addition 156x52 feet now under way.

# Automobile Road from Washington, D. C., to Atlanta, Ga.

A tier of counties in Virginia, the Carolinas and Georgia are working in a cooperative way to make a continuous good auto road between Washington and Atlanta. At Washington it will connect with the macadam road which Maryland is constructing via Baltimore to the extreme northeastern corner of the State on the way to Philadelphia and New York.

The counties are spending \$1,000,000 on roads and bridges. Their aim is to make a road which will attract auto tourists, especially during the winter months, when there is no other tour possible in the United States. It is claimed that the road will greatly stimulate automobile sales during a season which is usually quiet. The road is to be free, except at two or three toll bridges.

Each county improves its own link. About 300 miles of the road have been completed, and work is progressing in more than twenty counties. From Richmond south the route lies below the usual snow line, touching Raleigh, Columbia, Aiken and Augusta. The materials being used do not freeze or become muddy. At intervals of a day's journey there are high class winter resorts for the accommodation of tourists. Leonard Tufts, of Pinehurst, N. C., is president and Frank Weldon, of Atlanta, is secretary of the association which has induced the counties to take up the work.

Samuel H. Daddow, formerly with the Acme Motor Car Company, Reading, Pa., has bought a half interest in the business of E. S. Youse, same place, which will hereafter be conducted under the name of Youse & Daddow, wholesale and retail auto supplies. They will also act as local agents for the Hudson and Chalmers-Detroit lines.



RAMBLER EASTERN 1910 TEST CAR.

An account of the test run of two of these cars was given in our issue of August 25.

# The Electric Vehicle Field from the Standpoint of the Central Station.

The Electrical World of New York, a leading electrical journal, publishes in its August 5, 1909, number the results of an investigation which it has been making relative to the extent and conditions of use of electric vehicles, with special reference to the relations subsisting between electrical supply companies and the electric vehicle.

Inquiry sheets, including eighteen questions, were sent to about 4,000 central stations in all parts of the country, and answers were received from about 1,500 of the companies thus addressed. The questions asked had reference to whether the central station addressed was taking any part in pushing electric vehicles, the extent of the local use of these cars, the prices charged for charging current and for garaging, the number of local garages having facilities for caring for electrics and several other topics.

The general object of the inquiry, in addition to securing statistics, was to awaken interest among electric light and power companies in the electric vehicle as a source of revenue. The report is well worth reading by everyone who takes an interest in electric motor cars. Some of the facts brought out are briefly summarized here.

A very considerable proportion of the corporations addressed reported "nothing doing" in the electric vehicle line in their localities, and it is evident that there are large sections of the country where the electric is practically unknown, especially in the South and West.

In a large number of instances the districts reported upon were regarded as too hilly or too sandy to make the introduction of the electric a practical matter, and in certain cases the few electrics which had been introduced were reported to have been discarded in favor of gasoline cars.

In some of the smaller and less favored towns of the South and West the streets were reported to be of such a wretched character as to be impracticable for electric vehicles, or indeed for automobiles of any motive power.

Quite a number of correspondents stated that their towns were too small to render the use of exclusively town vehicles desirable, and that the surrounding country was unfitted for electrics.

Certain replies also indicated that the gasoline vehicle had acquired the whole local field, and that a strong prejudice existed against the electric, or at least an almost complete lack of information regarding its capabilities. High initial cost and limited radius of action appear to have been the shortcomings generally urged against it.

From the replies received it appeared that about 500 of the companies addressed were more or less awake to the possibilities of the electric vehicle field, and it is a significant fact that these companies represent

forty-one States and Territories of the Union.

About 250 of these corporations sent in definite information as to their activities in this line, ranging from an intended entrance into the charging field to an aggressive campaign for business. A number of these central stations expressed themselves as desirous of handling electric vehicles, and others of securing full data regarding their operation and charging.

According to data secured it is safe to say that there are about 10,000 electric vehicles in use in this country, and that \$50 per annum represents, on the average, the cost of the energy for charging each of these. About \$500,000 thus approximately represents the sum paid out for electric vehicle charging the country over.

It is estimated that slightly over 10 per cent of these vehicles are charged from isolated electric plants, the remainder being charged at public garages obtaining their electric energy from central stations.

A considerable number of companies report themselves as interested in the introduction of rectifiers in garages and elseswhere, but not directly concerned with the development of the vehicle business.

The rates made by electrical supply companies for energy to be used in vehicle battery charging vary very widely, and generalizations upon the subject are very difficult. Among 103 companies making flat rates, which vary from 2 to 20 cents per kilowatt hour, the average is not far from 71/2 cents per kilowatt hour. Where sliding scales, involving two or more rates depending upon demand, are adopted, a wide diversity of practice is to be noted. Such scales vary from 15 to 7 cents per kilowatt hour to 6 to 2 cents per kilowatt hour, a rate of 10 to 2 cents per kilowatt hour being somewhere near the average. Some companies make rather complicated rates, consisting of several scaled rates, dependent upon demand, systems of discounts and stipulations as to hours during which current is not to be used. Maximum demand meters are used to some extent, and time switches to cut off the supply during "peak"

As is perfectly natural, public garages seem to be favored in the matter of rates over private owners, the latter class paying nearly, if not quite, twice as much for current in many instances as the former. In the case of sixty-eight companies the garage rate and the private consumers' rate are in somewhat the ratio of 5 to 8. The minimum consumption required to secure the low garage rate is, of course, large as compared with the minimum consumption demanded of private users.

The data obtained indicate that garages frequently sell electric energy to their customers at double the price they pay for it, and that most garages make a good profit on the sale of electric current.

Investigation into the garage rates for combined charging, washing and delivering.

in all parts of the country, indicates that these flat rates range from \$20 to \$35 per month in cities and towns of ordinary size, and from \$30 to \$55 in the very largest cities. The lower rates appear to be found, as a rule, in the smaller places.

Sixty-one of the companies replying reported that they received some direct income from the charging of ignition accumulators, the station exciters, a bank of lamps or a small rectifier being employed. Revenues from this source ranged from \$5 to \$600 per year, and the prices charged per battery from 50 cents to \$1.

Although it is estimated that there are from 2.000 to 3,000 electric business wagons and trucks in use in this country, only a very moderate proportion of these are owned by central stations, where one might think they could be used very advantageously and act as an incentive to their public adoption. A few companies only, mostly in the larger cities or in places where the electric vehicle has attained prominence, employ officials whose time is exclusively devoted to the promotion of electric vehicle interests.

#### Ford 1910 Announcement.

The Ford Motor Company, of Detroit. Mich., will continue their Model T for 1910. The car will be furnished in three open and three closed styles, at the following prices: Roadster, \$900; tourabout and touring car, \$950 each; coupé, \$1,050; landaulet, \$1,100; town car, \$1,200. It will be observed that the prices of the open cars have been increased over those of 1909, but the equipment which will be furnished with these cars is more complete than it is this year. The equipment of the open cars will include an unlined top, an automatic brass wind shield, a speedometer, two gas lamps, a generator with connections, two side oil lamps, a tail lamp and a tubular horn. The equipment of the closed car will include two side oil lamps, a tail lamp and a tubular horn. The new prices will go into effect on October 1.

Obituary.

Edward M. Murphy, of Pontiac, Mich., president of the Oakland Motor Car Company, died at his home in Pontiac last Saturday of apoplexy, after only a few hours' illness. Mr. Murphy was born in Wayne, Mich., December 19, 1864, and lived there until twenty-three years of age. In 1888 he formed a partnership with C. V. Taylor, and started the first buggy factory in Pontiac, Mich. Withdrawing from the partnership in 1893 he organized the Pontiac Buggy Company, and served as president and general manager until about a year ago. when the company was consolidated with the Dunlap Vehicle Company, Mr. Murphy becoming president of the new company. In 1907 Mr. Murphy organized the Oakland Motor Car Company, which was sold to the General Motors Company a few months ago. Of late he had superintended the moving of the buggy company to Rockford, Ill.

# Commercial Applications.



### Taxicabs in San Francisco. By I. N. B.

BY 1. N. B.

San Francisco, always one of the greatest automobile cities in America, has taken to the taxicab with great avidity. Though the first taxicab company began actual operations in this city less than a year ago, there are now five concerns serving the public, and there is talk of others entering the field, and there are quite a number of privately owned taxicabs operated by chauffeurs who thought they could do better operating for themselves or by hackmen who found that the horse cannot stand the competition.

Besides this, there is not one of the companies now in existence that has not more machines on the way. There is talk that the business is being overdone, and that some of those operating taxicabs must meet the inevitable result of oversupply in any business, but the remarkable growth of San Francisco must be considered in weighing this pessimistic view, and the fact that it is essentially a "riding" town, not only because of its many hills, but because it is the nature of its people to ride, and because from year's end to year's end it is the resort of tourists from all parts of America and the world.

The average rate for a single passenger here is 50 cents for a half mile or fraction thereof. Some charge 60 cents. There are flat rates by the hour, being generally \$4 inside the city and \$3.50 for beach or park pleasure riding. For handbags carried outside the rate is 20 cents, and for a trunk, also outside, 40 cents is charged. Most of the companies run their cabs from 65 to 80 miles a day. The cabs of one of the newer companies make a mileage of 30 per day at present.

It seemed to take quite a while for taxicabs to get a footing in San Francisco after their introduction was first broached. Several companies were formed with a flourish and went out of business, after selling large quantities of stock by heavy advertising. Some of the purchasers of these stocks drop into the bona fide companies' offices even now on occasions and ask whether they can be given any clew to a dividend, but the companies seem to have faded away entirely, and the buyers have only experience as their return.

The first taxicab company to enter the field in San Francisco, that is to actually start cars running, was the Pacific Taximeter Cab Company, of which Fay C. Beal is secretary, treasurer and manager. It began operations only last January, starting its first cars on the 16th of that month. It has prospered from the beginning, and now has eleven cars running, and expects

to have nineteen more within the next few months.

The Pacific Company uses the French Renault machine exclusively. The cars are designated by an orange stripe. The garage occupies the whole lower floor of a brick apartment house at 1355-1363 Bush street, near Polk. It is large, but has no special features. The offices are at the same place. In fact, all the taxicab companies but one have their main offices at their garages. The Pacific Company has but one public stand, on Market street, in the business centre. It has a connection with the St. Francis and other hotels.

This company furnishes oil free to its drivers, but they are required to pay 15 cents a gallon for their gasoline, which is the present market rate. There is a measuring machine at the garage, and the day repair man has the key to the tank. Whatever gasoline is sold is signed for by the driver, and the account of each is turned in at the end of the week. The night repair man measures out gasoline similarly, and every morning the amount in the tank is balanced.

For quite a time the company kept no particular check at night, permitting the drivers to take what gasoline they needed and leave tags for the amounts. The haste of the drivers caused serious inaccuracies, for the company found that under this system it was facing an expensive deficit in gasoline each month. A night repair man was then put on, and since then there has always been a correct balance.

It was through Manager Beal of this company that the new ordinance, doubling the number of cab stands on the public streets, was adopted.

The Pacific Company is financed entirely by local capital. George P. Fuller is the president, and the other officers are Frank P. Hooper, vice president; Fay C. Beal, secretary and treasurer; Clarence R. Ward, Carroll N. Beal, Lawrence W. Harris and Rene J. Marx, directors.

#### THE TAXICAB COMPANY OF CALIFORNIA,

with a large wooden garage at 1618-1630 Jackson street, just off Van Ness avenue, has twelve taxicabs in operation now, and Manager W. E. Travis says twenty-five more will be received shortly. He says that the company will eventually have fifty in operation—most likely within three months.

The Jewell-Keeton is the principal machine used by the California Company. It has eleven of these, one Renault and one Clement-Bayard. This company has the largest number of outside stands of any in the city at present. In fact, it is the only one that does not do nearly all its business from its main office or garage, though it has three stands in prominent parts of the city.

The California Company makes a specialty at present of standing machines at the leading hotels, and its connections with these hostelries bring it a heavy business. It has stands at the St. Francis Hotel, the

Fairmont, the Stewart and the Manx, and even at the new Palace, which is not yet opened to the public. It maintains five others, one at the Union Ferry Station, where the great tide of traffic from outside and "across bay" pours into the city; one each in front of Tait's and Techau's fashionable downtown cafés; one at the White House, in the centre of the retail shopping district, and one in front of Donlon's drug store, at Sutter and Fillmore, which is the heart of the business section that sprang into life immediately after the fire and still has much activity, though the larger businesses have all moved downtown. With these stands the city is pretty well covered by this company, but it is contemplating establishing many more under the new ordinance increasing the number permitted. Those stands now used were obtained under the old cab ordinance, and are mostly locations where the horse drawn carriages that once held them have given way to the motor.

This company supplies its drivers with oil free of charge, but has a "service" system with gasoline. Some of the drivers get the gasoline at half cost and some pay full. This is according to time and diligence of service. An accurate register is kept, the Bowser tanks being used. A record of the amount measured out and the men to whom it goes, who are segregated into classes according to the service rule, is kept, and this roll is turned in each day and entered in a tabular book kept for the purpose.

W. E. Travis is the president and general manager of the company. The directors include Robert Murphy, George Wingfield, L. M. Hoeffler and R. L. Coleman.

The California Company advertises a flat weekday shopping rate of \$3 an hour, from 9 to 12 m., in the district east of Van Ness avenue, which contains all the principal stores.

#### THE TAXICAB AUTO LIVERY COMPANY

is the name of an active and prosperous "taxi" institution managed by J. R. Wilson, a former livery stable man. His partner in the business is A. P. Rooker, who is president of the company. They have a garage and office at 319 Van Ness avenue, a short distance from the "syndicate's" temporary theatre. At present all the business is done from that place, though the firm contemplates having stands as business grows.

Only Stevens-Duryea cars are used, and the white panel designates them. There are five in operation now and five more have been shipped. The five machines in use were transformed in this city. New bodies were put on and meters attached. They are very handsome cars, and apparently give very satisfactory service. The new ones on the way were transformed in the Fast.

The company has issued a very pretty and unique folder, which is one of the latest pieces of taxicab literature to be mailed throughout the city. It gives a program of the Portola festival, a concise history

of Don Gaspar, discoverer of San Francisco Bay, and has a poem on the fête. It is backed with the Portola colors, and gives rates and other information about taxicabs. This company supplies oil free to drivers, but charges them 15 cents a gallon for gasoline.

#### THE TAXI COMPANY.

with space in the Pioneer Garage, 911 Golden Gate avenue, one of the most pretentious garages at present in this city. operates six Chalmers-Detroit cars. It has no outside stand. A blue panel enables patrons of the company to distinguish its vehicles from the many others about the streets. It is a local company, with officers and directors as follows: Rov M. Pike, president and general manager; J. M. Hotchkiss, J. K. Armsby, H. D. Connick and Anson Herrick.

#### PALACE AUTO COMPANY.

The only company that has its main office downtown and separate from its garage is the Palace Auto Company. Its office is at 105 O'Farrell street, in the very centre of the retail, theatre and café district. Here it has one station. It has another in front of the Orpheum, one in front of D. Samuels' big dry goods house, at Stockton and O'Farrell streets, where many fashionable women shop, and a fourth in front of the Bismarck Café, the big, first class restaurant of Market street. Its garage is at McAllister and Gough streets.

The Palace Company has four cars of its own and it makes use of from four to five belonging to others that it calls on during its busier hours. The machines it has in its own garage are the Thomas. Besides cabs, the company also has some Thomas limousines, which it hires at the rate of \$4 per hour and \$2 per half hour. With the limousine type a taximeter is dispensed with, as a good portion of the people riding in cars prefer something that does not carry a rent sign in front. These limousines all carry speedometers and odometers, by which a record may be kept of the mileage, in case it is wished to charge exact taxicab rates.

The Palace Company expects to increase the number of its cars by half a dozen before winter. It has not decided what make the new ones will be. Both gasoline and oil are supplied free to its drivers.

All the local taxicab companies make repairs to the machines at their own garages. Pneumatic tires are used on all the taxicabs here. The Renault people tried the use of solid tires on theirs, but Manager Beal says he found the machines were jolted too much, and pneumatics are used exclusively now.

The compensation of drivers is uniform. They are given 20 per cent. of the money received and procure oil and gasoline on the basis already stated. The consensus of opinion among the men in the business is that a great deal of the success in its depends upon the employment of capable, intelligent and polite drivers, and effort is made by all of them to weed out all others While the garages of the taxicab companies are large and adequate, the business is so new that no elaborate special ones

have yet been constructed.

#### ADVERTISING.

The taxicab companies are heavy advertisers, both in the daily newspapers and on the dead walls of the city. Display "ads" in the public press and flaring posters on the fences keep the people reminded that there are such things as taxicabs, and advise them to "get the habit." The education of the people to the use of the vehicles is looked upon as an important work by the companies, and they are all assisting in it. Cards and folders are mailed at intervals to the addresses in the directory, so there is not a resident of the city who has not had information about taxicabs brought to him in some manner.

"And there is plenty of room for more work in this line," said the manager of one of the companies. "The people are learning fast, and new ones are making use of the vehicles every day, but you'd be surprised at some of those who even vet don't know what a taxicab is. A leading politician, when I told him the other day that I was in the taxicab business, surprised me by asking 'What is a taxicab, anyway?'

#### LEGAL RESTRICTIONS.

The laws that govern taxicabs here are generally those that govern automobiles, and are simple, having most to do with speed, rates and license. Specifically, the hack law covers the taxis, and a new one has just been passed through the efforts of Manager Beal of the Pacific Taximeter Company. All the change it makes is to permit four hack or cab stands to a block, instead of two, which will give the taxicabs a better chance to get in downtown, though, as stated, the hacks are being crowded out and their former stands become available gradually. This ordinance goes into effect October 15. At the head of the police committee of the supervisors, before which the draft of the ordinance had to go for consideration, was a union labor man, who had aspirations for the mayoralty. It was apparent that any further privileges given taxicabs would be detrimental to hackmen. The committee reported adversely upon the measure, but it was passed anyway by the board and signed by the mayor.

#### APPORTIONMENT OF STANDS.

Now comes the question of the apportionment of stands among the taxicab companies, and there is likely to be a pretty row over it. The law provides that the applicant must secure the signature of the owner of the property or the business concern in front of which he wishes to stand. and present it with his petition to the hack inspector, who recommends to the mayor, the latter issuing the privilege. Beal, with alertness, signed up all the desirable locations before the ordinance was even passed and put the applications in the hands of the hack inspector. He claims the right to the stands by priority, but the other companies say this amounts to nothing, and that after the law becomes effective they will expect to get their share.

It is a fact, though, that now by far the greater part of the business is done directly from the offices, and some of the owners expect that this condition will continue.

The companies all get business out of the big hotels. "Taxis" are summoned from the various companies by 'phone when there is none in sight.

#### EFFECT ON HACKS.

Gradually since the advent of the taxicab the hacks have decreased on the streets. Familiar characters who had driven fares for years in San Francisco, and had become features of its night life, have taken to other lines, though some, who have been thrifty, have acquired motor cars of their own, and are moving along with the tide of transportation progress. One of these, known for years to every nighthawk in San Francisco, has blossomed out with two limousines and his horses are probably doing duty on some ranch.

That the shabby, jolting hack, with its wheezy, jaded horses, should be brushed from the streets by the smooth running, spick and span motor cab is natural.

At the fashionable livery stables, where wealthy persons hire first class equipages, either for pleasure riding or shopping, the taxicab's advent is being felt-even more keenly than that of the automobile. The "taxis" are being utilized more extensively all the time by shoppers and women making their calls. The hacking companies that used to have offices at the big hotels are also suffering. The short hauls of the regulation automobiles are being cut into heavily.

There is one branch of the hack service that is left to the horse drawn vehicles, and that is the funeral business. On this some of the livery firms depend largely to hold out against the encroachment of the taxicabs, which they feel sure can never compete in this line of work.

The license upon taxicabs is that upon all passenger vehicles, viz., \$10 a year. The speed rate is 12 miles inside the city fire limits and 15 outside. There is a State license tax of \$2 a year. Under this law every machine must be registered with the Secretary of State, and is given a large number tag, which must be displayed at all times. Night lights are required by the city ordinance.

#### IN OAKLAND.

In Oakland, across the bay, a city of 200,000 population, privately owned taxicabs are run. Oakland has little of the night life of San Francisco, however, or the day bustle, for, while a prosperous and growing city, it is largely the sleeping place of San Francisco. It has beautiful roads for pleasure riding, though, and as it is a splendid automobile town generally the taxicab will probably get a strong foothold there. Taxicabs from this side do much business between the two cities. The passengers pay the ferriage, which is 75 cents for the machine and 10 cents for each passenger.

While San Francisco has 450,000 population or more, is essentially a motoring town, and is adding both population and buildings with a rush, it is almost safe to say that with the companies already in the field, their present equipment and the large number of taxicabs they contemplate adding, the business is about up to its capacity, though time can best determine this. The old night life of the town is far from being back at its fullest, but it is coming back all the time. This will add greatly to the business in the future. Then the people grow more used to the machines every day, and this causes the business to grow.

In a section where the automobile has won such tremendous favor the taxicab must come in for its share of the honors. The encroachment of motor vehicles on the peninsula of San Francisco was amusingly illustrated the other day during a sitting of the State Board of Equalization for the purpose of looking into county assessments. San Mateo adjoins San Francisco County, and has fine motoring roads. A member of the board who hails from one of the mountainous counties where burros and airships are the best means of transportation asked the San Mateo assessor why it was that fast horses, once forming a big item in the county's roll, had been almost eliminated.

"The automobile has run over them," was the assessor's laconic reply.

#### Autos for Indianapolis Board of Health.

The Indianapolis Board of Health has asked the city council for an appropriation of \$3,500 for the purchase of two runabouts, which are to be used by the city dairy inspectors. All dairies in Indiana supplying milk for Indianapolis consumption are inspected regularly by the city inspectors. Heretofore the work has been done with the aid of electric railway lines and horse drawn vehicles. A series of demonstrations with automobiles has shown three times as much work can be accomplished with such vehicles.

# Manila to Have Motor Fire Engines.

It is reported from Indianapolis that the fire department at Manila, P. I., is preparing to install automobile fire engines. C. F. Samuelson, assistant chief of the Manila Fire Department, was in Indianapolis a few days ago visiting a company that manufactures such engines, but left without placing an order, expecting to visit several factories before reaching a decision. The Manila department has been built up from practically nothing during the last ten years, and now has seventeen fire companies.

#### Commercial Notes.

John Swelander, Isanti, Minn., has established a motor livery business.

The Farmers Supply Company, of Wahpeton, N. Dak., will conduct a motor livery business.

A taxicab service with two Durocars is to be started in Pasadena, Cal., at an early date. The headquurters for the service will be at the Fair Oaks Garage.

C. H. Troyer, chief of police of Duluth, Minn., has made the suggestion that a motor ambulance be provided by the city and stationed at police headquarters.

W. E. Graham, who conducted a motor stage line from Porterville, Cal., to the California Hot Springs for a short time, has discontinued the service owing to the bad condition of the roads.

An automobile service has recently been established by Smith Brothers between Beaver City and Milford, Utah. The route is 32 miles long, and passes through Minersville, Adamsville and Greenville.

One of the Olds delivery wagons which had been used for carrying the mail in Detroit for the past three years has been replaced by a 40 horse power Oldsmobile. The other two cars will be similarly superseded in a short time.

The Appleton, Milwaukee, Chicago & St. Paul Transfer Company will operate an automobile transfer line between Appleton, Wis.; Seymour, a neighboring city, and other towns in the vicinity. Both passengers and freight will be carried.

Louis Blair, of Clearspring, Md., has bought a twelve passenger motor bus and will establish an automobile line between Hagerstown and Clearspring. Mr. Blair has been operating a passenger and freight line with horse vehicles for some years.

The Motor Transfer Company has inaugurated a taxicab service in Fort Wayne, Ind., having a stand in front of the Anthony Hotel. Two cars have been received and two more are to come. The rates are 30 cents for the first half mile and 10 cents for each quarter mile thereafter.

The Jackson City Auto Stage Company, Jackson, Amador County, Cal., which a short time ago established a motor stage service between Jackson and Stockton with two White steamers, has discontinued the service, and is now operating all its machines in the transient business.

Charles M. Deches & Brother, wholesale and retail grocers of the Oranges and adjacent towns, have recently put in service a 3,000 pound truck, made by the Autocar Company, Ardmore, Pa., for use between their warehouses and branch stores. It does the work of a number of horse teams, and in quicker time.

The Columbia Taxicab Company, of St. Louis, has secured the garage of the Bagnell Automobile Company, which will be suitably altered to fit it for the taxicab business. The Columbia Company will shortly have in operation forty Thomas cabs, which number will be increased later. The directors of the company, which was incorporated

only recently, are L. Wade Childress, Frank C. Rand, Robert H. Holmes, Marcus I. Brock and Frederick W. Thomas, the last two of Buffalo, N. Y.

The Nevada Auto Company, which conducts an automobile service between Searchlight, Nipton and Nelson, Nev., has recently added to its equipment a 40 horse power double chain driven Crawford car, and has now four machines in constant service.

The stockholders of the Monroe and Cincinnati Auto Bus Company at a recent meeting in Monroe decided to wind up the company's affairs. The company was organized to run a motor bus line between Cincinnati and Monroe in competition with the Big Four Railroad, but soon found that there was very little chance for its success.

An automobile delivery and motorcycle messenger service has been established at Indianapolis by the Retailers Motorcycle Service, which has just been organized and incorporated. The company has purchased a motor truck, a buckboard and three motorcycles, which will be increased as the demand requires. The concern will make a specialty of deliveries for department stores and other business houses, and in delivering messages from hotels.

# Gyroscope to Be Manufactured in Adrian.

It is reported that the Blomstrom Manufacturing Company have sold the patents for the Gyroscope car to the Page Company, of Adrian, Mich., and that the manufacture of the car will be taken up on a large scale in Adrian in the near future. The Page Woven Wire Fence Company and its allied concerns are old established manufacturers, and form the principal business interests of Adrian. They have been interested in the automobile business for some time, and have done a considerable amount of experimental work, having built a number of models fitted with air cooled motors, two cycle motors, etc.

A New Detroit Automobile Company.

The Krit Motor Car Company has been organized in Detroit to manufacture cars from the designs of Kenneth Crittenden. The capital stock is given as \$100,000, of which \$50,000 is subscribed for and \$23,000 invested in models, specifications, machinery and completed cars. The incorporators are B. C. Laughlin, W. S. Piggins, Claude S. Briggs, Kenneth Crittenden and C. W. Whitson, each of whom holds 100 shares of \$100 each. It is stated that four cylinder cars will be manufactured.

#### Carriage Firm Gives Up Auto Manufacture.

The Columbia Carriage Company, Hamilton, Ohio, who made twenty-five solid tire motor buggies, have decided to abandon the manufacture of motor cars, and will confine themselves to horse drawn vehicles hereafter.



### Complains of Treatment at Garages While on a Tour.

Editor Horseless Age:

Will you not take up a matter that concerns most motorists, namely, the brazen thievery that goes on in practically every garage in this part of the United States?

It has been my experience every time I turn my car in for either one night or more, when touring, to have sundry small things 'taken from it, and the last time, when in a large New York garage in the heart of the city, three articles amounting to over \$15 were taken, and absolutely no satisfaction was given me.

It is absurd to expect an owner to strip his car every time he puts it in a garage, and the fact that he pays for the care of the car at so much per diem should include its contents. I have found my tool chest broken open and small tools taken, a pair of gloves or goggles, tobacco, Scotch whiskey, a pocket pistol, blue books, robes, dusters, an umbrella—in fact something disappears at every stop I make.

Now, I take particular pains to tour very fully equipped for every comfort, and in making a one or two nights stop en tour I do not expect to pile out everything that has been closely packed away in the car for possible emergencies, change of weather, etc.

Garages put up a large sign that they will not be held responsible for things left in cars, and they thereby put a premium on the dishonesty of not only their own employees but of the chauffeurs who hang around the place.

That these chauffeurs take especial pleasure in overhauling a car that is run by the owner I well know, and they always empty my tobacco box and whiskey flask, and clean up any luncheon that may be in the basket.

It probably will take time to convince people on this side of the continent that there is a class in this country whose means would readily permit their employing a chauffeur, valet or maid, but who prefer to do without their services solely because they wish to do without their society. That such a class does exist, all those who have lived out West know. These people pay for service as they need it, and perhaps pay more in consequence than if they employed and kept on tap servants of their own, but they dislike hangers-on, and therefore do not travel about accompanied by an Irish or French boarding house.

In the West when a man runs his own car into a garage this fact is understood, and the man is judged for what he himself appears to be, but in this part of the country the man who runs his car to a garage is "poor white trash," and treated accordingly, no matter whether he pays liberally for

both storage and cleaning for his machine. And every time he puts his car up in a strange garage it is pilfered.

And let me say, moreover, Mr. Editor, that I have had this experience only in the East; I never lost a cotter pin from my car out West.

No wonder that I am but one of many who come East with the intention of spending my declining years in luxury here, and find I get anything but what I expected, and am returning to the far more comfortable and independent living on the Pacific Coast, just as soon as I can.

A DISGRUNTLED WESTERNER.

#### Automobile Statistics.

Editor Horseless Age:

Will you kindly advise me where I can obtain the following statistics? The approximate number of automobiles now in use, and the approximate number manufactured and sold last year in each of the following countries: The United States, Canada, England, Germany, France, Spain.

R. B. HEAD.

[It is extremely difficult to get accurate statistics of this nature. The following figures have been obtained from various sources, and are largely estimates based upon registrations or assessment records in previous years, except in the case of Germany, which takes a census of automobiles at the beginning of each year:

ESTIMATED HUM	BER OF	CARS	IN USE	ΑT	PRESENT.
United States					200,000
Canada					
England					100,000
Germany					18,500
France					40,000
Spain				• • • •	3,000

As to the number of cars manufactured in the different countries last year there are absolutely no reliable statistics on this point. The production in this country has been estimated at about 80,000. The production in Germany can be calculated fairly closely by comparing the number of cars in the country at the beginning and end of the year, taking account of the imports and exports, and making a fair allowance for retirement of old cars. On this basis we come to the result that about 7,000 cars were built in that country last year. For the other countries there are no figures available that we know of.—Ed.]

### Power Tire Pumps.

Editor Horseless Age:

I have been in the automobile game and a subscriber to your journal for the past six years. In that time I have progressed from one cylinder to six, from single tubed tires to a very satisfactory quick detachable type, from dry cells to a thoroughly reliable magneto as current source. I have been relieved of the labor and risk of cranking by a thoroughly reliable self starter. In fact I have seen the automobile develop and improve along every line except one. My tire pump is built upon the same plan as the one I used in 1903, slightly stronger perhaps, but requiring just as much sweat

to inflate a tire. In addition to the labor of operating the hand pump it is humiliating and aggravating to have 48 horse power stand idle beside me while I struggle with a relic of the earliest bicycle days.

Will you kindly advise me if there is a reliable air pump which I can attach to my motor for tire inflation? I have seen several advertised in your columns, but the cuts were so small that I was unable to secure from them any idea of the apparatus.

It seems to me there ought to be a large sale for a proper air pump suited for attachment to the various cars, and backed by a vigorous advertising campaign.

R. R. Lewis.

[We do not believe that there is the least necessity at the present time for pumping tires up by hand. Motor driven tire pumps are advertised in our columns regularly. Some of these have been on the market for a considerable number of years, and we have never heard a complaint about them.

—ED.]

# Starting Six Cylinder Motors on Compressed Air.

Editor Horseless Age:

As an old subscriber to your valued paper, I would like to ask the following question through your columns:

If a six cylinder, four cycle engine were provided with balanced piston inlet valves, auxiliary exhaust ports, and a check valve in the inlet pipe above the carburetor, would the engine always start upon compressed air being admitted to the inlet pipe or manifold? That is, would one or more inlet valves be open at any position the engine might stop, and would you consider it good practice? ENQUIRER.

[One inlet valve would always be open, and sometimes two, and the engine would start without fail if there were pressure in the tank. The inlet valves remain open during practically one-half revolution of the crank shaft. The periods of the six inlet valve openings therefore correspond to three revolutions of the crank shaft. It follows from this directly that half the time only one inlet valve is open, and half the time two are open.

The chief objection to your proposed design would undoubtedly be the check valve in the inlet pipe above the carburetor, as this corresponds to an automatic inlet valve, which has several disadvantages, among which may be mentioned the tendency to gum to the seat and that to reduce the volume of charge under certain conditions of running. It would probably be advantageous to use the checks in the air piping, and use the conventional valve system.

—ED.]

#### Safety Steering Gears.

Editor Horseless Age:

Your editorial on "Steering Gear Accidents" is aimed at the right idea, but seems to me to go about it wrong. The time is slowly arriving when excess weight and

duplicate parts will not be tolerated in an auto. The users are beginning to see that much weight and complication means much expense and worry. Sooner or later the emergency brake will go. Users are learning by experience that in an emergency they cannot think, and have no time to do anything other than they have by much practice learned to do without thinking. Only last month I was in a rig which stopped against a telephone pole because the driver lost his head on finding a team headed toward him on the wrong side of the road as he turned a bad corner. A single movement of the brake, throttle or clutch lever to reverse would have stopped the rig, but the driver simply could not think, and the possession of an anchor or a dozen emergency brakes would not have helped him. So with a broken steering gear. The rig is in the ditch and the damage done before the driver could awake to the fact that the car did not respond to the steering wheel and grab another wheel

The best thing to do is to make the parts so they will not break in the first place, and so will not immediately cease their functions if they do break in the second place. You will understand what I mean by this if you remember that a cycle is not unsteerable if its handle bar comes loose, A properly hung cycle will go right ahead without a bar, and can be ridden over fairly large obstacles like a brick "hands off." Provide autos with similar steerings, and they will run with no strain on the steering parts in the first place, and will continue with reasonable certainty if the steering arms and links are broken in the second place.

Worm devices are used to take the strain and ierk off the driver's hands. This does not lessen the jerk on the arms and links of the rig, however, and the very fact that they are held rigidly increases the likelihood of breakage. The willow and oak comparison holds good here, as in many other places. The irreversible steering gets strains that the steering free to yield does not. The steering pivots can be placed in the plane of the wheels, as in a cycle, or inclined at the side, as has been done in Duryea vehicles since the beginning, and then there is practically no strain on the arms and links. This can be readily proven by dropping off the tie rod, which runs parallel to the axle, and the free wheel will continue on its course just as if steered. I have proven this more than once. Have crossed car tracks paved between with cobbles; have climbed short hills and made turns during the climb, and have driven for considerable distance on fair roads with one wheel free in this manner. CHAS. E. DURYEA.

The Motor Racing Association, of New York City, will hold another twenty-four hour race on the Brighton Beach track September 24-25, coincident with the opening of the Hudson-Fulton celebrations. The race will start at 6 o'clock on Friday evening, so it will not interfere with the night pageant on the Hudson on Saturday.

#### Automobiles in Spain.

The use of automobiles is restricted by the high price of gasoline and by the poor roads. Owing to the almost prohibitive duty on gasoline, it costs 49 cents per gallon there. Nevertheless automobiling is making progress in Spain, and while the use of the machine is confined to the wealthy few, more machines are being manufactured in Spain and imported from abroad every year. The president of a leading automobile club estimated the cars in use in September, 1008, to be as follows: Madrid and district, 500: Barcelona and district, 600: Guipuzcoa and Sebastian, 300; Vizcaya (Bilbao), 200; Palma de Mallorca, 300; Seville and district, 100; all other parts of Spain, 1,000; total, 3,000.

There is only one Spanish concern engaged in the manufacture of automobiles. This plant, founded in 1902, has grown steadily in importance. It turns out cars of various horse power, the most popular model being the 20 horse power. In addition to a steadily increasing home market, its machines are exported to Argentina, Mexico and Porto Rico. A French company has a branch factory at Vitoria, near San Sebastian.

Imports of automobiles, while not very considerable, are important when compared with the total number of machines in Spain. The total in 1907 was 227 cars, valued at \$248,774, of which only 4 cars, worth \$3,460, came from the United States. France furnished 151 cars, valued at \$170,059.

The average price of a first class 20 to 24 horse power, four cylinder gasoline car in Barcelona, with open side entrance body, is from \$3,100 to \$3,175; second grade four cylinder French cars, of well known make, \$300 to \$400 cheaper. Cars in use in Spain range from 16 to 40 horse power, the most popular car being the 16 to 20 or 20 to 24 horse power. Steam cars have been tried but given up. Steam cars and electric runabouts ought, however, to have a decided advantage in Spain on account of the high price of gasoline.

#### OPENING FOR AMERICAN AUTOMOBILES.

A local automobile man states it to be his opinion that an excellent market can be developed in Spain for American makes. This opinion, the result of careful comparison between American and European cars, is based upon difference of price in favor of American cars, as well as their greater adaptability to Spanish conditions. American cars, being made very strong and high swung, run admirably along the Spanish roads. Attention is again called to the opportunities for American supplies, tires, lamps, tools, etc.

If American makers can put their cars in Spain at prices which permit competition with foreign, particularly French, cars, their superiority for rough work ought to give them an appreciable advantage. In spite of the great vogue enjoyed by French cars, the Spanish buyer would undoubtedly receive American cars favorably when once

convinced of their superiority for his own purpose. But it must be steadily borne in mind that to convince the Spanish buyer of the advantages of our machines catalogues and price lists will not suffice. He must be able to see the car, examine it carefully, and even take trial spins before he will consider the matter seriously. To deal with prospective customers agencies must be established and equipped with good lines of machines and supplies, where cars can be submitted to a thorough examination and comparison with competing makes. All the leading French manufacturers have such agencies at Barcelona, in addition to some Italian and German houses. A little advertising of the right sort would undoubtedly be effective. In a recent contest -La Copa de Cataluna-for voiturettes, the first prize was won by a French car. The race aroused tremendous enthusiasm, and the presence of a good American car would have done much to attract attention. The Copa de Cataluna is an annual event, being held every spring.

Very few automobile drays are seen in Spain, carts drawn by strings of mules or a pair of oxen being commoner sights, even in Madrid and Barcelona. The Madrid postal authorities have an automobile service to and from the railway stations. Imports of automobile drays and delivery wagons in 1907 were valued at \$27,391.—Consular Report.

#### Book Review.

Principal Automobile Routes of the United States and Canada, 1910. By H. Sargent Michaels. Published by the Henneberry Company, 554 Wabash avenue, Chicago. Price, \$1.25.

The book contains brief route descriptions of sixty touring routes, most of which start from Chicago. It gives the distances to all points en route, and a list of hotels arranged by cities alphabetically. It is accompanied by two loose maps, one of Chicago and its suburbs, and the other of a part of Illinois and Wisconsin.

#### Milwaukee Municipal Garage.

Milwaukee, Wis., is considering the establishment of a municipal garage to care for the eight automobiles now owned by the fire and police departments of the city. It was found very expensive to keep the machines in various different garages. By erecting its own garage the city hopes to reduce this expense, as well as to insure their more adequate repair, and to prevent machines being used for other than strictly municipal purposes. A site has already been purchased by the city. City Comptroller A. M. Gawain and a number of aldermen favor the plan.

According to a recent report by the Austrian Consul at Amsterdam, Holland offers a good opening for the importation of motor cars. In 1908 a brisk business was done in the lighter type of motor cars.



# New Connecticut Law Now in Effect.

The amended automobile law passed by the Connecticut Legislature during the last session went into effect on September 1. Following is an abstract of the law:

All registrations are now annual. Owners' registrations expire December 31 at midnight and drivers' registrations the last day of February at midnight. Upon the sale of a car its registration expires, but the vendee may file a new application, and upon the payment of a fee of \$2 may have registered another car in his name for the remainder of the calendar year, provided the horse power of the new car is not greater than that of the old one; if it is greater, he must pay in addition to such fee the difference between the fee paid by him for the motor vehicle sold or transferred by him and the fee for the registration of the motor vehicle of the higher horse power.

All operators of motor vehicles and motorcycles must obtain a license annually. The fee for an operator's license is \$2. Licenses must at all times be carried by the licensee when he is operating a motor vehicle or a motorcycle. Operator means a person who has obtained a license to operate a motor vehicle or a motorcycle.

Non-residents who have complied with the laws of the State of their residence may use the highways of Connecticut not exceeding ten days in any one year without complying with the provisions of this act relative to the registration of motor vehicles and the licensing of operators, but must cause to be displayed on their motor vehicle the distinguishing number or mark of the State within which they reside, and said number or mark shall be displayed upon two plates substantially as provided in Section 4 of this act; provided, however, that if any non-resident be convicted of violating any provision of Sections 11, 12, 18 or 10 hereof (relating to speeding, escaping after accidents and refusal to show license to police officers), he shall thereafter be subject to and required to comply with all of the provisions of this act.

No person shall operate a motor vehicle on the public highways of this State recklessly or at a rate of speed greater than is reasonable and proper, having regard to the width, traffic and use of the highway, or so as to endanger the property or the life or limb of any person.

Each machine is required to bear a different number and be registered separately. One set of official markers are furnished annually without charge. Only official markers can be used, and must be obtained of the Secretary of the State; provided, that in case of the loss or mutilation of a marker, the owner or person controlling a motor vehicle must immediately place a temporary plate bearing his registration number on such motor vehicle and within twenty-four hours after such loss or mutilation notify the Secretary and apply for a new set of number plates, which will be furnished on the payment of \$1. In case of a loss of certificate or license, duplicates may be secured from the Secretary on payment of 50 cents for each duplicate of license or registration.

Manufacturers, dealers and liverymen will be required to use special markers, furnished by the Secretary, six sets of which will be furnished with the certificate of registration, annually, and one pair of plates for individual owners, upon application therefor, without charge.

The registration certificate of each machine must be conveniently kept in the same. Each operator must carry his license so it can be shown when required.

All applications for registration and license must be made on blanks furnished by the Secretary, the writing must be legible and signature plainly written. All blanks must be filled in and all questions answered. All registration cards must be returned to Secretary's office unmutilated, as they are used in a filing case as a card index.

Upon the sale or transfer of ownership, any person in whose name such motor vehicle or motorcycle is registered must return to the Secretary's office the old certificate, together with the name and address of the new owner. All operators must indorse their signatures on the space provided immediately upon the receipt of such license, and the license will not be valid until so indorsed.

#### LICENSE FEES.

The fees for annual registration of cars are as follows: \$1 for each motorcycle, regardless of horse power; \$5 for each commercial motor vehicle, regardless of horse power: \$10 for each motor vehicle owned or controlled by a liveryman; 60 cents per horse power for every other motor vehicle of 25 horse power or more; 50 cents per horse power for every other motor vehicle of less than 25 horse power. The horse power must be based on the A. L. A. M. rating formula in the case of internal combustion engines, and in the case of steam and electric cars must be based on the horse power as advertised by the maker, and in the case of two ratings the registration must be based on the higher rating. A pro rata reduction in fees is allowed on applications for registration filed after the 1st day in June in any year, and the Secretary of State has had tables prepared showing at a glance the amount of the fees to be paid for cars of any horse power up to 24, in any calendar month from June to December, inclusive, and for cars of any horse power from 25 to 80, in any calendar month from June to December, inclusive, respect-

#### Recent Decisions.

LIMITS OF PERIOD OF GRACE.

Massachusetts statutes authorized a nonresident who has complied with the laws of his State to use his automobile in Massachusetts fifteen days without a license. It was held that a trip into Connecticut and Vermont and time lost in the repair shop were not to be excluded in estimating the time, and that where the owner of an automobile had exceeded his privilege in operating his car more than fifteen days without a license, he was a trespasser on the highway, and in an action against a street railway company for injuries he was only entitled to the rights of a trespasser, and a verdict for the railway company was properly directed.—Dudley v. Northampton St. Rv. Co., 80 N. E. 25.

#### BREACH OF WARRANTY.

An action was brought in the Supreme Court against the manufacturer and the sales agent for damages for breach of warranty of an automobile. Previously an action was brought in the Municipal Court by the agent for repairs, in which action the purchaser set up damages on the breach of warranty as a counter claim. It was held that he was entitled to a trial of his counter claim notwithstanding the action in the Supreme Court, as the parties were not the same.—Robert Thompson Co. v. Levis, 117 N. Y. Supp. 1057.

#### AGENT'S RIGHTS.

Where an agency was established by an automobile manufacturing company, and the agent agreed to take three automobiles, and to have a discount of 20 per cent., and to make a deposit of \$250 on each on ordering the cars, and after he received one car the company rescinded the contract and established another agency, it was held that the agent was entitled to recover the deposits made on the other two cars not furnished.—Drake v. White Sewing Machine Co., 118 N. Y. Supp. 178.

### Coroner's Verdicts in Race Fatalities.

John J. Blackwell, coroner of Marion County (Indianapolis), in his report on the death of Claude S. Kellum, the mechanic who rode with Chas. Merz on the Indianapolis track, says in part as follows:

"I find by the inquest that the cause of the accident was the bursting of a tire on the automobile driven by Charles Merz.

"I find that the cause of the bursting of the tire that caused the death of C. S. Kellum was the unfinished track, and that the Indianapolis Speedway Company put on the races before the track was completed and safe.

"I firmly believe that the Indianapolis Motor Speedway Company should have used more precaution, and not have allowed the races to go on until the track was in good condition."

Coroner Brewer, of Brooklyn, who made an inquest into the deaths of Leonard Cole and Laurente Grosse, mechanic and driver, respectively, of the Stearns car that collided with one of the Acmes on the Brighton Beach track on August 27, states in his verdict that "the men came to their death through a collision between the Stearns and Acme machines, due to the recklessness of the Stearns crew in trying to pass the Acme near a turn"

### Joy Riding Epidemic in Detroit.

During the past few weeks a great number of autos have been stolen in Detroit, mostly for joy riding purposes. Last week four youths were sentenced in the Justice Court to pay fines of \$100 each, and serve ninety days in the house of correction, for taking an auto which they ran out of town and badly damaged in a nearby village. This was the maximum sentence under the old law, but on September I a new statute went into effect which makes the taking of a machine without the owner's consent a much more serious offense. It remains to be seen if the more severe penalty will reduce the number of offenses.

### Wisconsin Gasoline Inspection Law Defeated.

By dismissing the suit brought against Thomas B. Jeffery & Co., of Kenosha, Wis., for refusing to pay for the inspection of seventy-two barrels of gasoline as provided for under the new oil inspection law, Judge Clifford E. Randall took the first step in declaring the statute unconstitutional. The Jeffery Company brought the test case in the interest of all automobile owners. The State will probably carry the case to the Supreme Court.

#### Legal Notes.

By an ordinance which has been given its second reading by the Columbus (Ohio) City Council, quantities of gasoline cannot be stored nearer than 50 feet to any structure. The ordinance will likely be enacted and will change the method of storing gasoline on the part of several Columbus garages.

Alderman Dunn, of Chicago, has drawn up an ordinance which provides for the examination and licensing of all drivers of public automobiles. The ordinance is said to have the support of Alderman Arthur B. McCoit, president of the Chicago Taxicab Company. It is at present in the hands of Howard W. Hayes, assistant corporation counsel.

The Turner Brass Works, Sycamore, Ill., have secured a temporary injunction against the Vanguard Manufacturing Company, restraining them from manufacturing, selling or using spring bumpers infringing the Harroun patent, which is owned by the Turner Brass Works. We understand that nine other suits are now pending against alleged infringers of this patent.

The police of Boston are strictly enforcing the provision of the new State law requiring the blowing of the horn before

coming to crossroads or intersecting streets. Officers are stationed on Massachusetts avenue, between Boylston street and the Harvard Bridge, and at Columbus avenue and West Newton street. No warnings are given, but all who fail to blow their horn are arrested.

#### Ordering Repair Parts.

By H. S. WHEELER,

"Did you ever experience difficulty in obtaining the correct repair part for your car?"

"Yes."

"Did you ever think that the factory repair department was not 'up to snuff'?"

"Yes."

"Did you ever stop to think that any concern's satisfied customers are its best advertisers, and that it would consequently be far from sane business policy to give customers anything but the best of service from this department?"

"Yes, but--"

"I know; but did you ever stop to think when incorrect parts or parts that did not fit were sent you that perhaps you were just a little to blame?"

The repair and parts order department of any firm engaged in a manufacturing business of the nature of the automobile business is the one thing acting as a stepping stone or as a stumbling block, as the case may be, in the stream between manufacturer and consumer. It must anticipate possible parts breakages and the wear to which all machines are subject, and must furnish at a moment's notice parts necessary to repair a car produced ten years ago, as well as for a car built yesterday.

Let us look at the quantities of stock which must be carried. For a product of 4,000 cars made in four different models a certain factory's "parts price list" shows that approximately 5,600 parts can be furnished. Actually this quantity will run to about 6,000.

Various elaborate systems must be devised for maintaining such a stock, composed of parts as different as wooden seat bottoms and lubricating oil or front axles, and "internal hub brake operating lever latch spoon bolt nuts." Each piece of this stock must be accounted for at all times, and it must be known just how long a certain number of each part should last, how great a quantity should be ordered at a time, and how long after ordering before the goods will be available for shipment.

Granting that the stock is maintained in an absolutely satisfactory manner, we come to the proposition of filling parts orders. Let us take a concrete case.

You skid on a wet pavement and break a wheel; telephone the garage to get the "darn" car and fix it up, and go on home to your dinner. That evening the garage wires the factory: "Express right front wheel painted Smith's car." They don't stop to think that wheels are not right and left.

In the morning you get up early, so you will get down to business via street car on time, and about noon, when you've about decided to go out to the Country Club for a round of golf you remember your car is not running, and 'phone the garage what the news is regarding the wheel.

A wire was received some time ago from the factory reading "Wire relative front wheel; give us car number quick.' Seven men in your city named Smith have cars of the same make as yours, and, anyway, you didn't take the trouble to write the factory for future reference that you owned car No. 10,787.

Of course, the garage people don't want you to know they forgot to wire in the car number when ordering, so you are informed that no news has been received.

Fine service you are getting from the factory, aren't you? You call your stenographer in and tell her to take this wire: "Rush wheel for car quick. Answer." The girl sends the wire, signing, it as usual, "Easton Real Estate Company"—not Smith—and, of course, you do not think to include in your wire that the Empire Garage ordered the wheel.

Not wanting to take the interurban out to the Country Club, you decide to stay in the office, and about 3 o'clock you, or rather the Easton Real Estate Company, get a wire: "No wheel on order for you. Send full information."

You sit down and dictate a letter that makes your stenographer blush, but incidentally mention the name of the garage which ordered the wheel. When the factory receives your letter everything is perfectly clear to them. They write or wire you, and wire the garage (which in the meantime has wired in the car number): "Information satisfactory; wheel goes American Express today."

After waiting patiently or impatiently for the express to come, the wheel finally arrives in good condition.

If you had looked over your parts price list, and had wired for "one culvert," you would have received it by first express.

Moral: Order repair parts correctly and you will receive correct parts.

# To Build Double Power Cars in Philadelphia.

The Standard Gas and Electric Power Company is being organized in Philadelphia to manufacture touring cars and trucks equipped with a combination gasoline and electric power systems. The touring car is to be fitted with a 35 horse power motor and the truck is to be of 3 tons capacity. The company also plans to build a track motor car for use in interurban service on steam railroads. A special feature of the automobiles is that the changes of speed are effected by means of push buttons instead of a gear lever. Samuel S. Eveland, president of the Standard Roller Bearing Company, is largely interested in the new company.

#### The Lowell Races.

The Lowell (Mass.) Automobile Carnival started on Monday, Labor Day, with the so called national small car sweepstakes. This consisted essentially of three races held over the same course at the same time. These races were held over a circuit 10.6 miles in length, known as the Merrimac Valley course. The three races were as follows:

For the Vesper Trophy, open to cars of 301-450 cubic inches cylinder capacity, with a minimum weight of 2,100 pounds; twenty rounds, 212 miles.

For the Yorick Club Trophy, open to cars of 231-300 cubic inches cylinder capacity, with a minimum weight of 1,800 pounds; fifteen rounds, 150 miles.

For the Merrimac Valley Trophy, open to cars of 161-230 cubic inches cylinder capacity, with a minimum weight of 1,500 pounds; twelve rounds, 127.2 miles.

The Vesper Trophy was won by Robert Burman (Buick), who covered the 212 miles in 229 minutes 8 seconds. He made his fastest lap at the rate of over a mile a minute. The Yorick Club Trophy was won by Louis Chevrolet (Buick), in 2:56:17, and the Merrimac Valley Trophy was won by "Billy" Knipper (Chalmers-Detroit), who covered the 127.2 miles in 2:28:43. Knipper was protested by Arthur See, driver of a Maxwell, which came in second, on the ground that he had the hood on his car open during the race, but the protest was disallowed.

The race was attended by large crowds, and passed off without fatal accidents. One car ran off the course onto an embankment and turned over; another crashed into a telegraph pole and several people were injured.

### Following are the summaries:

- onowing are the summaries.	
CLASS 2-212 MILES.	
Finish. Driver and Car. H. P.	Time.
1-Robert Burman, Buick 30	3:49:08
2-Ernest Stoecker, Benz 28	4:02:55
3—Bert Dingley, Chalmers-De-	
troit 40	4:04:19
4-Lewis P. Strang, Buick 30	4:06:34
5-F. H. Sharp, Sharp-Arrow 35	4:00:50
CLASS 3-159 MILES.	
Finish. Driver and Car. H. P.	Time.
1-Louis Chevrolet, Buick 18	2:56:17
2-Ray Harroun, Buick 18	3:15:51
CLASS 4-127.2 MILES.	
Finish. Driver and Car. H. P.	Time.
1-Wm. Knipper, Chalmers-De-	
troit 36	*2:28:43
2-Arthur See, Maxwell 22	2:40:11
3—L. Costello, Maxwell 22	2:44:01
4-J. M. Matson, Chalmers-Detroit 30	2:52:16
5-L. A. Desbrow, Buick 18	2:53:37
6-W. Sickinger, Maxwell 22	2:58:34
7-Frank Gelnaw, Chalmers-De-	
troit 30	3:11:17
* Protested.	•

On Tuesday a series of 1 mile straightaway speed trials were held over a specially laid out stretch on the Merrimac Valley course, and a new record for the mile with standing start was established by Barney Oldfield, driving a Benz racer. His time was 51 1-5 seconds. Oldfield also made an attempt to lower the flying start mile record, but could do no better than

39 9-10 seconds, which is 1½ seconds more than the record time. Walter Christie, who was to have been one of the stars of the day with his front driven racer, was unable to take part in the events, owing to the twisting off of a shaft on his machine early in the day. Lewis Strang, another racing notability entered for the events, also did not appear. Next to Oldfield the best performance during the day was scored by Louis Chevrolet (Buick), who won two firsts, two seconds and one third. The summaries follow:

Class Four—Gasoline Stock Cars, Selling \$1,251 TO \$2,000.

		I mie.
Driver and Car.	H. P.	M. S.
E. B. Blake, Jackson	. 40	1:03 4-5
CLASS ONE-STOCK CARS, SEI \$3,000.	LING	2,001 TO
		Time.
Driver and Car.	H. P.	M. S.
Whales, Matheson	. 50	1:02 1-5
CLASS THREE-STOCK CARS, SELL	ING AB	OVE \$4,000. Time.
Driver and Car.	H. P.	M. S.
H. Lytle, Apperson	50	:52 4-5
Fred Belcher, Knox		
FREE-FOR-ALL, STANDING		
,		Time.
Driver and Car.	H. P.	M. S.
Barney Oldfield, Benz	. 120	:51 1-5
Louis Chevrolet, Buick		
J. J. Coffey, Columbia		
Whales, Matheson	. 50	1:03 2-5
CLASS ONE—STOCK CHASSIS, 45 INCHES.	1 <b>1</b> 0 6	oo Cubic
		Time.
Driver and Car.		M. S.
Louis Chevrolet, Buick		1:01 3-5
Fred Belcher, Knox		1:02 9-10

INCHES.

CLASS TWO-STOCK CHASSIS, 301 TO 450 CUBIC

Driver and Car.	Н. Р.	M. S.
Robert Burman, Buick		1:07 7-1
G. De Witt, Buick		1:08 1-1
TRIALS AGAINST TIME, FLY	ing Si	ART.

	Time.
	. M. S.
Barney Oldfield, Benz	:39 9-10
H. Lytle, Apperson	:44 2-5
Louis Chevrolet, Buick	:49 9-10
Ray Harroun, Buick	:52 1-5
Louis Disbrow, Knox	:57 7-10
F. H. Clapp, Berkshire	1:029-10

### Special Metallic Mirrors for Headlights.

It will be remembered that one of the lamps fitted with gold plated reflectors which was tested by the R. A. C. in their recent trial of headlamps had its mirror constructed on the Cowper-Coles system, instead of being formed like an ordinary metallic reflector or with a metallic backing behind a glass body. The lamp in question was that entered by the Reflector Syndicate, and had a 22½ candle power

acetylene burner, arranged within the focus of its parabolic mirror. As with the other gold plated reflectors which were entered by other makers, the primary object in the use of gold in lieu of silver is that of softening the light in such a way that it not only ceases to be so dazzling to other road users, but that its penetrating powers through mist and fog are enhanced considerably. A special interest attaches, however, to the Cowper-Coles system itslf, and consequently a few words concerning its object and its nature will be very appropriate now that so much attention is being given to lamps for motor cars.

Originally the endeavor was made in connection with naval searchlights to substitute metallic mirrors for those made of glass, because the older type of mirror was apt to be readily broken by concussion when firing the guns, and because, too, the silvering at the back was very liable to blister off the surface of the glass under the influence of the weather. To that end. the Cowper-Coles electrolytic process was introduced whereby the convex side of a glass former or mold had a thin silver film deposited upon it by chemical means, and the former or mold was then spun in an electrolytic cell so that copper was deposited upon the silver surface. This latter process was continued until the silver film had received a sufficient backing of copper to impart the desired rigidity to the finished mirror, and subsequently the metallic mirror thus built up was separated from the glass mold by being placed in a vessel containing cold water, the temperature of which was gradually raised until the expansion of the copper was sufficient for the purpose. The silver face produced in this manner has as highly polished a surface as glass, and then only needs to be subjected to an after-treatment which will prevent the silver from tarnishing.

An intensely bright beam is projected by this mirror, and so dazzling is the light that it is impossible for those within its area to aim accurately at the projector, while another advantage of the construction is freedom from fracture by concussion or of any great area of distortion even when penetrated by bullets.

A number of mirrors made in the way we have just described have been employed by the War Office, but Mr. Cowper-Coles has more recently introduced a metallic mirror of another kind, which is only partly made by electro-deposition. This type of reflector has a surface composed of alternate bands or rings of gold and silver, for which a more penetrating beam of light is claimed both at night and in foggy weather.

For automobile purposes, of course, a reduction of dazzling effect is of predominating importance, even though penetration at night or in fog is an invaluable feature. Mr. Cowper-Coles has therefore brought out yet another form of glass or metal parabolic mirror coated with a yellow metal for this particular work.—Automotor Journal.

### MINOR MENTION



Raymond M. Owen, of New York, informs us that, rumors to the contrary not-withstanding, his automobile connections are limited to the Reo and Premier.

The Drummond Carriage Company, of Omaha, Neb., are selling out their line of carriages and buggies to make room for an automobile repair business and the manufacture of automobile bodies and tops.

George W. Burnside, R. J. Wells, B. S. Wells and Thomas Fawick have formed a stock company at Sioux Falls, S. Dak., with a capital stock of \$100,000, to manufacture the "Silent Sioux," a two cylinder car.

C. H. Stratton, president of the C. H. Stratton Carriage Company, of Muncie, Ind. is negotiating with the business men of Wabash, Ind. with regard to the location of an automobile factory there. Mr. Stratton has several novelties in the line of convertible automobile bodies.

The Howard Motor Works, of Yonkers, N. Y., will be removed to Athens, N. Y., and reorganized as the Athens Motor Truck Company. Designs are now being gotten out for a 1.000 pound delivery wagon and I ton truck. Operations in the Athens plant will probably begin about the middle of November.

The Holson Motor Patents Company, of Grand Rapids, Mich., which is the parent company exploiting the Holson electric truck construction in which the motors are placed inside the driving wheels, has changed its name to Church Balance Gear Company, Ltd. M. B. Church owns the controlling interest in the company.

The contract for the decoration of the Grand Central Palace, New York, for the Tenth International Automobile Show has been let to Unitt & Wickes. The building is to be transformed into a trellis garden, a scheme which involves a lattice and land-scape effect with myriads of electric lights and huge fire balls to bring out the pictorial scenes and floral designs.

The Jewel Carriage Company, of Carthage, Ohio, point out that, contrary to a statement made in our issue of August 25, they will not turn out a \$1,500 car for 1910, but will continue the manufacture of their touring car at the same price as in 1909, viz., \$2,000. In addition they will turn out five other models, including a runabout, ranging in price from \$1,750 to \$1,000.

In the annual report of the directors of the American Locomotive Company it is stated that the sales of automobiles manufactured by the company have greatly increased, and business in this department was so satisfactory during the past year that a number of the buildings of the Providence plant, which were abandoned after the panic by the locomotive department, have been fitted up for the manufacture of automobiles.

James Fletcher, of Seatonville, Ill., is endeavoring to organize an automobile manufacturing company at Peru, Ill.

In Kearny, Neb., and vicinity eightyseven cars are said to be owned, twentyeight of these being Ramblers, twenty Buicks and fourteen Reos.

H. C. Biddison has purchased the entire interest of W. C. Schoelkopf in the Schoelkopf Manufacturing Company, Madison, Wis., and the name has been changed to the Biddison Manufacturing Company.

Raymond B. Doty, of Cleveland, Ohio, has designed an electric car which will be manufactured by the Cleveland Electric Vehicle Company. We are informed that in a recent test run the car, which is a four passenger machine, ran 133 miles on one charge of the battery.

The Sternberg Manufacturing Company, of Milwaukee, Wis., will remove their plant to West Allis, Wis. A new factory, 200x350 feet in dimensions, will be constructed of brick and concrete. William Sternberg, president of the company, estimates that the new plant will enable the company to turn out 200 motor trucks yearly.

The W. A. Salter Motor Company, is erecting a factory at 1510-1516 Oakland avenue, Centropolis, Kansas City, Mo. The company was organized recently by W. A. Salter, who formerly lived in Cottonwood Falls, Kansas. It will turn out a 40 horse power car with a motor and transmission invented by Mr. Salter.

It is reported from Grand Rapids, Mich., that the Austin Automobile Company, of that city, is to be removed to Toledo, Ohio. J. E. Austin, president of the company, when interviewed in regard to the matter, said that the company had received several offers from other cities, but had not yet decided whether it would accept any of the offers.

General Veraqua, commissioned by the Government of Peru to make a study of North American and European army equipment, recently made a visit to Racine, Wis., to inspect several cars manufactured there, and left an agent, Professor Pimienta, to make a thorough investigation of the durability and hill climbing capabilities of these automobiles.

The Studebaker Automobile Company, of South Bend, Ind., who guarantee their cars for one year, inform us that the total expense to them of the guarantee on 1,571 Studebaker-Garford chassis during the period from March, 1905, to October, 1908, amounted to only \$16,620.18, or \$10.51 per car. They claim to have been more than liberal in making good their guarantee.

The total exports of automobiles from San Francisco during the month of July amounted to thirteen cars, valued at \$21,-283, and parts valued at \$3,127, as compared with twenty-two cars, valued at \$42,732, and parts valued at \$5.806 during the same month the previous year. Of the thirteen

cars exported last July nine were shipped to Hawaii, one to England, one to Canada, one to the Philippines, and one to Japan.

The Hudson Motor Car Company state that they expect to deliver at least 5,000 of their "20s" before March 1.

The Timken Roller Bearing Company, Canton, Ohio, are adding new buildings, increasing their capacity 200 per cent.

Heald's Automobile School, San Francisco, Cal., has been moved from 425 Mc-Allister street to 521 Van Ness avenue.

The G & J Tire Company have established a branch in St. Louis, at 4148 Olive street. in charge of J. P. Trader, formerly manager of the Firestone St. Louis branch.

A. C. Yocum & Co., motor manufacturers, Reading, Pa., will soon move into their new factory at Oakland, a suburb, where they will turn out a three or four cylinder runabout named the Speedwell, at a moderate price.

The Auto Radiator Works have been established at 379' Valencia street, San Francisco, Cal., under the management of Harry H. Pencovic, and will engage in repair work on radiators and other sheet metal parts of automobiles.

The drawing for spaces at the Atlanta Automobile Show will be held at the M. A. A. M. rooms, 7 East Forty-second street, New York, today (Wednesday) at 2 o'clock. L. M. Bradley has been appointed publicity manager for the show.

In our comments on the Glidden tour we gave it as our opinion that solid rubber tires did not permit of maintaining a speed equal to that called for by the schedule. In making this statement we had in mind true solid rubber tires, and not the so called airless tires.

The Sheldon Axle Works Company, of Wilkes-Barre, Pa., who manufacture springs for automobiles on a large scale, are considering the advisability of engaging in the manufacture of other automobile parts, which would necessitate the erection and equipment of a special factory.

The United States Carriage Company, of Columbus, Ohio, has decided to engage in the manufacture of touring cars, runabouts, motor hearses, cabs and ambulances. The concern will manufacture a four cylinder engine, with which the vehicles will be equipped. The new cars will be on the market early next year.

John Harter, of Oceola, Ohio, has invented a sectional steel tire, which is to be fitted over the ordinary pneumatic tire to protect it from injury, and to reduce wear. The whole steel tire consists of sixty-five sections, which are connected together by a pair of flat steel strips. A set of these tires is at present being made by the Carroll Works in Bucyrus, Ohio.

Several automobile dealers and manufacturers of Indianapolis had exhibits at the State Fair held in that city the week of September 10. No special provision was made for automobile exhibits, and the dealers and manufacturers were compelled to use tents. There has been agitation for

several years in favor of a building for automobiles, but through economy the State has refused to build it.

J. K. Skowlund, a Milwaukee automobile dealer, has opened a school for the instruction of automobile drivers and salesmen.

The Schildwachter Carriage Company, New York city, have opened a salesroom for automobiles in the Thoroughfare Building.

The Wisconsin Automobile Supply Company, Two Rivers, Wis., has enlarged its factory there and is planning to increase its equipment.

The new four story brick and concrete addition to the factory of the F. B. Stearns Company, Cleveland, Ohio, is to be completed by September 15. It measures 120x180 feet.

The Speed Changing Pulley Company, of Anderson, Ind., has changed its name to the De Tamble Motors Company, automobile motors being now the principal line of manufacture of the company.

The contract for the two story, 100x300 feet, reinforced concrete addition to the plant of the Rapid Motor Vehicle Company in Pontiac, Mich., has been let, and the building is to be completed by December 1.

During the week ending August 28 Ford cars led the New York registrations with 55, followed by Packard with 31, Buick 22, Cadillac 22, Maxwell 20, E-M-F 16, Mitchell 13, Studebaker 13, Autocar 12, Franklin 10, etc.

The Stoddard-Dayton Automobile Company, of Philadelphia, have secured new show rooms at 253 North Broad street, where a new building is in course of construction for them. The Courier car will also be handled.

The Garland Automobile Company has been organized to handle Speedwell and Velie cars in New York city, and has secured salesrooms at 1657 Broadway. The officers of the company are G. W. Garland, president; G. P. Strobel, vice president, and John A. Garland, secretary.

#### Club Notes.

A meeting of automobile owners in Shreveport, La., was held at the State fair on August 26, with the object of perfecting the organization of the Shreveport Automobile Association. The call for the meeting was issued by the management of the State fair.

A meeting was held at the Commercial Club in Medford, Ore., on August 24, with the object of organizing an automobile club. It is stated that in Medford and vicinity no less than 180 cars are owned, and considerable interest is being taken in the proposed club.

The Washtenaw A. C. was organized at a meeting held at Ann Arbor, Mich., on August 25th. The following officers were elected: H. W. Douglas, president; R. T. Dobson, vice president, and J. S. Scovel, secretary and treasurer. The club plans to combine all motorists in Washtenaw County.

Meetings will be held the first Tuesday of each month and the annual membership dues have been fixed at \$2.

The New Mexico A. A., Albuquerque, N. M., which is said to have been practically dormant since last spring, is to be revived again, and a meeting was called at the Commercial Club a short time ago, at which new officers were to be elected. The term of the old officers expired last May

The Austin (Tex.) A. C. was organized at a meeting held August 27, in the council chamber of the City Hall, which was attended by about fifty owners of machines. A. C. Goeth was elected temporary chairman and O. E. Millican, temporary secretary. A committee to draft a constitution and bylaws was appointed.

#### Garage Notes.

A fireproof garage building is being erected for the Keystone Garage Co., Norristown, Pa.

Malcolm Stewart has begun the erection of a garage in Hoquiam, Washington, on Seventh street, opposite the City Hall.

The Clark-Pratt Automobile Co. are erecting a garage in Ontario, Ore. It will be a brick structure with cement floor and metal ceiling.

The Kingman-St. Louis Implement Co., who recently secured the agency for Rambler cars, have leased a garage at 2117-2119 North Broadway, St. Louis.

Hicks & Borden have leased the Wentland Building in Charles City, Ia., and plan to open it as a garage. They will handle several lines of low priced cars.

The firm of Newson & Rimes, St. Louis, Mo., have established an automobile repair shop in connection with their tire vulcanizing plant at 4108 Olive street.

L. A. Newman, Auburn, Neb., has sold his garage and automobile business to Geo. Codington and Harry Furlong. The new owners have placed Albert Putnam in charge of the business.

The Mora Sales Co., of Syracuse, N. Y., is being reorganized, Charles J. Roehn having retired from the concern. The company will handle Regal and National cars the coming season.

The Munger Automobile Co., Dallas, Tex., have sold their garage to the Staten-Kicber Auto Co. The garage is located at Jackson and Prather streets. The Staten-Kleber Co. will handle the Mitchell line.

A. J. Pray, formerly a traveling salesman, will open at Fourth and Chestnut streets, Columbus, Ohio, within a week or two, with the agency for the Studebaker line. F. E. Averv has been handling the E.-M.-F. cars.

The Nyberg Automobile Works, 2437-2439 Michigan avenue, Chicago, have added another story to their building, which gives them a total floor space of 30,000 square feet. Mr. Nyberg has taken the agency for the De Tamble Roadster.

An addition is being made to the Regent Garage of Philadelphia, whereby the storage capacity will be doubled. When the alterations are completed the garage will have two entrances, on Baltimore avenue and Springfield avenue, respectively.

The Dayton Motor Car Co. will have a branch house in Seattle, Wash., for the season of 1910, under the management of Ira D. Lundy. Mr. Lundy is now making an effort to find a location for his headquarters. For the last three seasons he has been salesman for the Winton Motor Carriage Co. in Seattle.

The Janesville Motor Car Co., of Janesville, Wis., has started work on the construction of a garage at 140 to 146 North Main street, 44x100 feet in dimensions, two stories high, of brick and stone. The first floor will have no pillars on posts, giving an unobstructed floor space of more than 4,500 square feet. Wilson Lane is president

and treasurer of the company, and Harry Mc-Daniel is secretary and manager.

S. D. Perry will open a garage in Kaneville,

P. M. Shelton is opening a garage at Amarillo, Tex.

The Simplex Automobile Co., New York city, have leased stores at 1862 and 1864 Broadway.

. Ed. Van Lennep and Clarence Willis, Auburn, Cal., have formed a co-partnership and embarked in the automobile business.

The Curtin-Williams Automobile Co., Columbus, Ohio, no longer handle the Premier and the Oldsmobile, but retain the Cadillac.

The Overland Automobile Co.'s branch at Chicago has secured a lease on the property at 2425 Michigan boulevard for a term of fifteen years, on which a new building will be erected.

which a new building will be erected.

W. D. Williams, of Bedford, Ind., and Thomas Meeker, of Indianapolis, Ind., have leased the Rhodus Building on Capitol avenue, Indianapolis, and will shortly open a garage under the style of Williams & Meeker.

Warner M. Bateman, a former newspaper man of Pueblo, Col., has secured the agency for the Studebaker line in San Diego, Cal., and on October 1 will occupy the garage at 1144 First street, now occupied by Leon T. Shettler.

The firm of Olson & Hunter, who represent Winton and Mitchell cars in Oakland, Cal., have had plans prepared for a new 100x125 foot garage building on .Twelfth and Jackson streets. Work on the building will be begun immediately.

Lou Rose has purchased the interest of his partner Dulmage in the Dulmage-Rose Automobile Co., operating a garage in Spokane, Wash., and will continue the business for himself. Mr. Dulmage has accepted the agency for the Studebaker in Portland, Ore., and will open a garage there.

The Vicksburg (Miss.) Automobile Co. has been organized with a capital stock of \$10,000, to start business September 1. The following officers have been elected: J. H. Hempen, president; F. E. O'Neil, vice president; A. J. Martin, treasurer; B. J. Reid, general manager; Lee Richardson, secretary.

The Pioneer Automobile Co., of San Francisco, have leased a property at Van Ness avenue, Mc-Alister street and Ash avenue, with a frontage of 120 feet on Van Ness avenue, and depth of 219 feet. The company plans to erect a three story automobile repository and garage building on the site.

The Coston Automobile Co., Asheville, N. C., which was recently incorporated with a capital stock of \$20,000, and purchased the garage of the Southern Automobile Co. on Patton avenue, has elected the following officers: Dr. C. B. Reynolds, president; Junius G. Adams, vice president, and J. A. Coston, secretary and treasurer. The company will install a repair shop.

C. C. Swinborne and James A. Murray will erect a double garage building on East Quartz street, Butte, Mont. There will be two buildings connected by archways, each occupying a 50 foot lot. The building will be one story high on Quartz street and two stories at the rear, and a repair shop will be located in the basement. The buildings will be of brick and concerete, and will cost about \$20,000.

The E. R. Thomas Motor Co., of Buffalo, have established a branch in Chicago, temporarily located at 1325 Michigan avenue. A new building is now under construction for the branch in Chicago's automobile row, farther out on Michigan avenue. C. T. Paxson, who has had charge of the Thomas retail department in Buffalo since its inception, has been appointed manager of the Chicago branch, and Gaylord Warner, of Kansas City, will be his assistant.

The Portland (Me.) Motor Mart and Garage has been established at 17 to 21 Forest avenue, close to the centre of the city. The proprietors are W. W. Griffin and W. E. Whipple. A number of dealers are said to have taken space in the mart, there being two large salesrooms on the Forest avenue side. In the basement may be stored seventy-five cars and forty-five more on the street floor. The building is provided with an elevator accommodating the largest cars. The Intervator accommodating the largest cars.

state line of cars will be handled. Rosco G. Willard will have charge of the garage.

C. J. Hagensen, of Rochester, Minn., plans to open a garage in Jackson, Tenn., if he can find a suitable building.

Dr. J. W. Hawkins conducts the Barbados Garage at Westbury House, Barbados, West Indies, and also acts as agent for the Ford cara.

J. W. Garland, Jr., of New York city, has secured the agency for Velie cars for New Jersey and for the State of New York, south of Albany.

The Maxwell Agency in Freeno, Cal., of which E. R. Pelts is manager, have secured new head-quarters on I street, containing 7,500 square feet of floor space,

The Selden Motor Car Co., Boston, Mass., has removed from its former location on Boylston street above the railroad bridge, to 801 Boylston street, corner of Fairfield street.

The Ellinwood Disc Sled Co., Ellinwood, Kan., will immediately begin the erection of a single story 50x120 foot garage building, to be completed in two months. The company handles the Mitchell line.

The building at the southeast corner of Jefferson avenue and Randolph street, Detroit, has been remodeled into an up to date automobile salesroom, and is now occupied by the Cunningham Auto Co. They handle the Studebaker lines.

An addition to the O. K. garage at Arcata, Cal., has been completed, and will be used as a machine shop. The dimensions of the shop are 30x45 feet., and the machinery is to be driven by a 2 horse power electric motor.

J. T. Baxter and Mr. Robinson have purchased the repair shop of Midyette & Rushing, Jackson, Tenn., and will remove it on September I from III West Lafayette street to 210 and 212 Shannon street, where they will open a garage in a former livery stable.

W. A. J. Schmelzinger has opened a garage in the rear of 84 Walnut street, Springfield, Mass. The present storage capacity is sufficient for twelve cars, but the garage is to be enlarged so as to house thirty-two. Peter Miller will have charge of the garage.

Milton P. Stiles is erecting a two story 52x100 foot garage building at Ventura, Cal. Only the first floor will be used for garage purposes, however, the second story being fitted up for office purposes. The front and side of the building will be of white pressed brick.

The owners of the Cliff House, San Francisco, Cal. have made an offer to the city to turn over to it the garage building erected in Cliff avenue, on land already owned by the city, without authority from the supervisors. The garage is used by patrons of the ocean resort.

The Superior Motor and Machine Works Co. has been organized at Duluth, Minn., to conduct a garage and automobile agency business on Broadway and Banks avenue, Duluth. The officers of the company are as follows: A. T. Roth, president; Ben. Eimon, vice president, and Dr. H. J. O'Brien, secretary and treasurer.

The Philadelphia branch of the Winton Motor Carriage Co. will be housed in a new building by the first of next year. The building now occupied by the branch at 246 and 248 North Broad street, is to be torn down and replaced by a more modern structure. Temporary quarters will be secured until the new building is completed.

E. Zeller, proprietor of the Palace Hotel, Napa, Cal., has just completed the Palace Garage opposite the hotel on First street. It is a 120x60 foot structure of galvanized iron with cement floor. The equipment includes a mercury rectifier for charging storage batteries and a compressed air plant for the inflation of tires. J. C. Jacobson is manager of the garage.

The Jungclas Automobile Co., of Cincinnati, Ohio, plan to erect a new garage building on Reading road and Maple avenue, Avondale. It is to have a frontage of 71 feet on Reading road, and 150 feet on Maple avenue. The first floor is to contain salesrooms for cars and accessories, as well as stock rooms, and there will be two driving entrances on Reading road and one on Maple avenue. On the second floor will be the offices.

chauffeurs' room, ladies' waiting room, supply room, etc.

Booth & Dexter, of Parker, S. Dak., have bought the repair shop established by Koeppe & Hunt in Gettysburg, S. Dak.

James Healey, Carthage, Mo., has purchased a property on Chestnut street between Second and Third streets, on which he will erect a two story garage building.

The Crown Auto Co., who handle the Cadillac car in Cincinnati, Ohio, have recently moved from 108 West Court street to larger quarters at 2624 and 2626 Reading road.

The Rystrom Implement Co., of Stromsburgh, Neb., have purchased a lot adjacent to their implement building, on which they will immediately erect a 25x100 foot cement block garage building.

The Brush-Chicago Co. are planning to erect a new four story building on Chicago's automobile row on lower Michigan avenue, to be completed by November 1. Architects are now at work on the plans.

The new garage of the Totten Auto Co., Rock Island, Ill., located on Third avenue and Seventeenth street, has been opened for business. The garage contains a repair shop, and has facilities for charging storage batteries and vulcanizing tires.

The Bennett Auto Supply Co., Sioux City, Ia., are adding two stories to their building in Nebraska street, making it a four story structure. The third story will be used as a stock department for the supply store, and the top floor will be given over to a machine shop.

A new garage building is being erected for H. C. Goodchild on East Main street, Salem, Ohio. It will be a single story structure 30x103 feet, with a fancy concrete front and entrances at both the front and rear. The garage will have a cement floor and a repair shop in the rear.

Smith & Morgan, Youngstown, Ohio, will erect a garage building in East Boardman street. The building will be of brick and stone, with a frontage of 50 feet and a depth of 65 feet. It will be two stories high with a basement. The ground floor will serve as a storage room, and a repair shop will be fitted up on the second floor.

Plans have been drawn for a six story and basement reinforced concrete automobile building on Twenty-fifth street, Chicago, between Michigan and Wabash avenues. The building has already been leased to an automobile concern for term of twenty years. The plot measures 62½x110 feet, and the cost of the building is estimated at \$75,000.

A new fireproof concrete and steel garage is nearing completion at 73 Washington square South, New York city. It has 63 foot frontage, and is L shaped, being 52 feet deep on one side, and 96 feet on the other. There are three floors and a basement. The building is provided with an elevator, two turntables, two washstands and an air compressor.

#### New Incorporations.

The Pyramid Motor Car Co., of Danbury, Conn., has filed notice of an increase in capital stock from \$10,000 to \$100,000.

Marquette Motor Vehicle Co., Chicago, Ill.— Capital stock, \$20,000. Incorporators, Isaak L. Marks and David J. Marks.

Houston Motor Car Co., Houston, Tex.—Capital stock, \$10,000. Incorporators, E. T. Barden, H. D. Ellis and O. E. Coverdill.

Ogden Wind Shield Co., Chicago, Ill.—Capital stock, \$2,500. Incorporators, Henry P. Sinden, Sirell R. Janius and Karel E. Rada.

Olds-Oakland Automobile Co. of Texas, Houston, Tex.—Capital stock, \$10,000. Incorporators, C. F. Gydeson, Robt. Druschke and N. B. Jedd.

The Economy Motor Car Co., East Cleveland, Ohio.—Capital stock, \$10,000. Incorporators, Willis E. White, Frank T. Corell, O. E. Smith, C. H. Clark and W. W. Clark.

The Aberdeen and Hoquiam Transportation Co., Aberdeen, Wash.—Capital stock, \$35,000. Incorporators, C. G. Palmberg, Albin W. Norblad, G. A. Hemple and Thos, Toivonen, of Astoria, Ore.; C. E. Reikki, of Houghton, Mich., and John Olin, of Chinook, Wash.
Imperial Motor Co., of Kansas City.—Capital,

Imperial Motor Co., of Kansas City.—Capital, \$20,000. Incorporators, W. F. Tuttle, G. V. Dodge, Gail Reed.

Holly Motor Co., Seattle, Wash.—Capital stock, \$10,000. Incorporators, John C. Hollingsworth and John A. Lane.

The Miller Motor Co., Milwaukee, Wis.—Capital stock, \$20,000. Incorporators, H. C. Mueller, J. Hirsch and Peter Barth.

United Motors Co., Chicago, Ill.—Capital stock, \$5,000. Incorporators, William F. Gray, George I. Derr and D. B. Cole.

The Fenimore Garage Co., Yonkers, N. Y.— Capital stock, \$2,500. Incorporators, Jos. Haight, E. J. Dalton and E. J. Larkin. The Motor Service Co., Camden, N. J.—Capital

stock, \$100,000. Incorporators, Harvey L. Lechner, Doering Bellinger and W. G. Jones.

Elmore Motor Car Co., Los Angeles, Cal.— Capital stock, \$75,000. Incorporators, E. B. Smith, D. B. Rose and Clarence F. Smith.

Helena Auto Co., of Helena, Okla.—Capital stock,, \$2,000. Incorporators, C. N. Brewer, J. G. McCulley and C. H. McCulley, all of Helena.

An amendment has been filed by the Battery Light and Power Co., of Milwaukee, decreasing the capital of the concern from \$25,000 to \$15,000.

Pueblo Auto Goods Co., Pueblo, Col.—Capital stock, \$10,000. Incorporators, W. H. Bullen, L. G. Walker, R. E. Cruzen and William Anderson. American Automobile Co., St. Joseph, Mo.—Capital stock, \$25,000. Incorporators, W. G. Campbell, John F. Garber, C. R. Vaughn and others.

Jackson City Garage, Jackson, Cal.—Capital stock, \$10,000. Incorporators, Henry Thorpe, Joseph J. Ratto, P. Marcucci, John Strohm, George W. Lucot.

The Hinton Automobile and Supply Co., Hinton, W. Wa.—Capital stock, \$2,500. Incorporators, C. C. Coalter, John Leslie, C. W. Garrett and W. L. Fredeking.

Queen Colony Garage, Corona, Cal.—Capital stock, \$10,000. Incorporators, James L. Davis, W. C. Barth, John P. Triolo, W. E. Hetfield and O. A. Huxsaw.

The Woods Engineering Co., Alliance, Ohio.— Capital stock, \$30,000. Incorporators, F. C. Woods, F. A. Woods, F. A. Hobbs, W. C. Brown and H. H. Woods. The Little Rock Taxicab and Transfer Co.,

The Little Rock Taxicab and Transfer Co., Memphis, Tenn.—Capital stock, \$20,000. Incorporators, Louis Wolfort, L. Reinman, Alfred Mayer and C. S. Wolfort.

The Blevins-Studebaker Auto Co., Toledo, Ohio.
—Capital stock, \$10,000. Incorporators, H. W.
Blevins, C. P. Lauchmans, T. E. Coles, F. W.
Caughling and P. F. Parrot.

Auto Transit Co., Covington, Ky.—Capital. \$3,000. Incorporators, L. Hill, Jr.; J. M. Morrison, John Craig, Thomas Anderson, J. M. Polk, T. O. Gibbs, J. B. Sandford.

The Cataract Motor Co., Paterson, N. J.—Capital stock, \$350,000. Incorporators, Louis A. Piaget, Wm. H. Sherman, Foster W. Freeman, Geo. F. Hannah and Harris J. Westerhoff,

The E. R. Thomas Motor-Branch Co., Boston, Mass.—Capital stock, \$100,000. Incorporators, E. L. Thomas, president; J. M. Edsall, secretary and treasurer: C. S. Henshaw, manager.

Ohio Motor Co., Carthage, Hamilton County, Ohio.—Capital stock, \$10,000. Incorporators, Chas. F. Pratt, James W. McCutcheon, Albert E. Schafer, Lewis L. Townley and Ida A. Pratt.

The Eddy-Sherwood Carriage and Motor Co., Bridgeport, Conn.—Capital stock, \$5,000. Incorporators, Henry Sherwood, of Fairfield; George E. Eddy, of Bridgeport, and George S. Jennings, of Southport.

A. D. Goetz Co., Charlestown, W. Va.—To manufacture harness, saddlery, automobiles, etc. Capital stock, \$25,000. Incorporators, A. D. Goetz, Geo. B. Goetz, Hiram A. Goetz, Maria A. Goetz and Jenny S. Goetz.

The Allen Taxicab Co., New York City.—Capital stock, \$1,000,000. Incorporators, A. E. Wilson, Geo. A. K. Sutton, Geo. E. Holmes, Thos. F.

Barrett and Kenneth K. McLaren, all of 37 Wall street, New York city.

The Aberdeen and Hoquiam Transportation Co., Hoquiam, Wash.—Capital stock, \$35,000. Incorporators, C. G. Palmberg, Albin W. Norblad, C. A. Henkle and Thos. Toivonen.

#### Trade Personals.

G. M. McGreggor, secretary and treasurer of the Ford Motor Co. of Canada, left on August 26 for Australia, where he will open a Ford branch

Felix A. Eisner, M. E., sailed for Europe Thursday on the George Washington, of the Hamburg Line, in the interest of the E. R. Thomas Motor Company.

G. A. Malcomson, of Chatham, Ont., has been appointed to the position of manager of the Ford Co. of Canada, which will shortly be established at Winnipeg, Man.

H. L. Center, who recently sold his interest in the Ollinger-Center Motor Car Co. in Salina, Kan., has been appointed assistant to the general manager of the Buick Texas branch, with headquarters

S. W. Rushmore sailed on the Mauretania last week for a six weeks' tour in Europe. Mr. Rush-more plans to establish a branch of the Rushmore Dynamo Works in Berlin, and will visit the existing branches in London, Paris and Milan.

D. E. Simmons, of Beloit, Wis., has accepted the position of a superintendent in the factory of the Mitchell Motor Car Co. of Racine, Wis. Simmons was formerly foreman of the polishing department of the Fairbanks-Morse Co. of Beloit.

Walter G. Morley, who in the past has been connected with the Olds Motor Works and the Aerocar Co., and who more recently acted as manager of the Canadian branch of the Reo Motor Co., has connected himself with the Ford Motor Co. as purchasing agent, succeeding H. C. Limbach,

O. S. Tweedy, who for many years was manager of the Chicago branch of the Diamond Rubber Co., and more recently was connected with the Federal Rubber Co., has been appointed sales manager of the Continental Caoutchouc Co. of New York, E. E. McMasters and I. H. Sheldon have been appointed district sales managers for the West and East, respectively.

E. Leroy Pelletier, formerly advertising manager of the Everitt-Metzger-Flanders Co., of Detroit, has been appointed general advertising manager of Studebaker Automobile Co. and Studebaker Brothers Manufacturing Co., with headquarters at South Bend, Ind. In his new capacity Mr. Pelletier will have full control of all advertising of Studebaker horse drawn vehicles and the full line of automobiles handled by the Studebaker Co.

#### Trade Literature Received.

Gabriel Horn Manufacturing Co., Cleveland, Ohio.-Circular of the Gabriel bugle horn.

Studebaker Automobile Co., South Bend, Ind.-Automobile route book of the Central States. Oakland Motor Car Co., Pontiac, Mich.—Advance announcement of 1910 Oakland automobiles. Automobile Supply Co., 1326 Vine street, Phil-

adelphia, Pa.-Circular of the Auto License Tag W. H. Johns-Manville Co., 100 William street,

New York.-Catalogue of J. M. Asbestoside, a fireproof, weatherproof siding.

Bradley-Phillips Co., 292 North Park street,
East Orange, N. J.—Circular of Bradley-Phillips

"Ideal" sectional steel auto garages.

Hoyt Electrical Instrument Works, Penacook, N. H .- Catalogue of Hoyt ammeters, voltmeters and voltammeters for direct current.

The K-W Ignition Co., Whitney Building, Cleveland, Ohio.—Bulletin No. 12 of K-W ignition apparatus and electric lighting system.

#### New Agencies.

Atlanta, Ga.—T. J. McConnell, Moon. Berlin, Wis.—W. E. Schaefer, Corbin. Houston, Tex.—J. F. Siegmund, Hupmobile. Washington, D. C.-Warner Motor Co., Crawford.

San Luis Obispo, Cal.-Sam Toggnazzini, Buick.

### Patents Issued July 20, 1909.

928,334. Pneumatic Tire.-Robert J. Ruths, Baltimore, Md. Filed September 10, 1908.

1. A tire consisting of a tube and a cover, a tread ring and a grip ring secured to the cover. layers of material covering the tire, the tread and the grip, a continuous metal sheet covering the entire tread, and spikes passing through the metal into the tread with their heads protruding.

928,433. Pneumatic Tire Armor.—Charles E. Evans, Council Bluffs, Iowa. Filed February 7, 1908. (Chain type.)

928,520. Anti-Vibration Device for Vehicles of Any Kind.—Georges Huysmans, Brussels, Belgium. Filed December 23, 1908. (Rubber air cushion between frame and body.)

928,611. Vehicle Tire .- William A. Köneman, Cudahy, Wis. Filed June 22, 1908. (Sectional

inner tube.)
928,731. Vehicle Tire.—Martin Lehrer, New
York, N. Y. Filed August 16, 1907. (Armored strip between inner tube and casing.)

928.868. Non-skid Tire.—Eleazer Kemnshall. London, England, assignor to Kempshall Tyre Company of Europe, Limited, London, England. Filed November 5, 1907.

928,848. Traction Wheel.-Newton Campbell, Elizabethtown, Ohio, assignor of one-fourth to Harry J. Sykes and one-fourth to Joseph W. Hayes, Elizabethtown, Ohio, and one-fourth to George H. Wilson, Cleves, Ohio. Filed April 18, 1908. (Spring plunger tread.)

928,486. Variable Speed Gear.—Herbert E. Williams, Portsmouth, England. Filed January 27, 1008.

928,648. Speed Changing Mechanism.,-Walter O. Foss, Philadelphia, Pa., assignor to Frederick C. Brunhouse, Philadelphia, Pa. Filed September 11, 1908.

028.568. Variable Speed Gearing.-William A. Widmer, Danbury, Conn. Filed March 17, 1909. (For motorcycles.)

928,705. Changeable Speed Gearing.-Walter Scott, Sheridan, Wyo. Filed December 10, 1908. (Parallel driving and driven shafts with gears not meshing. An intermediate gear and mechanism for shifting it to connect successive gear pairs.) 928,727. Speed Controlling Mechanism.—Austin M. Wolf, New York, N. Y. Filed July 11, 1908. (Two speed and reverse spur gear and two pairs of bevel gears, giving four speeds and reverse.) 928.739. Friction Drive Mechanism for Auto mobiles.-Albert B. Cole, St. Louis, Mo. Filed

November 23, 1908. (Cone and bevel type.) Internal Combustion Engine.-Emile 928,842. Berliner, Washington, D. C. Filed March 31,

1909. (Valve gear details.) 928,715. Engine.—Thomas A. Thurber, Stockton, Cal. Filed March 1, 1907. (Revolver type driving through cam.)

928,824. Circuit Closer .- Orville M. Tustison, Bainbridge, Ind. Filed June 30, 1908. (Key operated switch for coils.)

928,790. Automobile Fifth Wheel .- Evertt A. Oliver, Richland, Mo. Filed May 18, 1908.

928,800. Roller Bearing.—August Schilling, Berlin, Germany. Filed October 24, 1907.

928,803. Fuel for Internal Combustion Engines.—George B. Selden, Rochester, N. Y. Filed December 7, 1903. Serial No. 184,083. Renewed May 13, 1909.

The combination with a suitable liquid hydrocarbon, of picrate of naphthalene and peroxide of

hydrogen, substantially as described.
928,828. Carburetor.—Alexander Winton, Cleveland, Ohio. Filed April 9, 1907. Serial No. 367,215.

### Patents Issued July 27, 1909.

928.954. Transmission Gearing.—George Flessa, Rawhide, Nev.

Disc friction.

928,955. Automobile Propelled Vessel.—John W. Freeman, Joplin, Mo.

928,956. Anti-Friction Bearing.—Heinrich Froböse, Bielefeld, Germany.

Ball separator for annular type bearing.

928,968. Explosion Engine.-Bertron G. Harley, Pittsburg, Pa.

Two cycle.

929,100. Governed Pump.—Norman McCarty, Indianapolis, Ind. Fuel pumps.

929.122. Tire.—Samuel S. Childs. Bernardsville. Automobile Buffer .- Allan L. Mc-

Gregor, Duluth, Minn.
929,193. Cover for Pneumatic and Like Tires.—

Henry W. Cave-Browne-Cave, London, England. Non-skidding tread.

929,197. Headlight for Vehicles.—Arthur E. Dobbs, Winona, Minn.

929,203. Tire Shield .- Joseph H. Fletcher, Seattle, Wash.

Rivet filled tread.

929,208. Wheel.-Leonard J. Goodspeed, Rockford, Ill.

Wheel .- Frederic R. Mather, Whites-929,234. ville, N. Y.

Detachable rim

929,262. Electric Igniter for Explosion En gines.-Walter C. Thornhill, Minneapolis, Minn. Make and break piston operated.

929,260. Carburetor.-John W. Stevens, St. Paul. Minn.

Carburetor .- Bert Rinke, Detroit, 929,327.

929,331. Storm Front for Vehicles.-George W. Scott, Troy, Ohio.

920.351. Pneumatic Tire.-Paul I. Viel. Paris. France.

Air Compressing Pump.—Sven Dahlberg, Springfield, Mass.

929,418. Tire.-George H. Gillette, New York,

Cushion inner tube.

929,425. Variable Speed Gearing.—Joseph Heim, Winnipeg, Man., Canada.

Multiple bevel gear.

929,426. Ball Bearing.-Fritz Henzelmann, Chicago, Ill.

Intermediate spacing balls.

929.427. Anti-Friction Bearing.-Fritz Henzelmann, Chicago, Ill.

Ball separator.

Pneumatically Operated Ignition De-929,429. vice for Gas Engines.-Charles G. Hess, Center, Col.

Make and break.

929,437. Vehicle Wheel.—William L. Howard, Trenton, N. J. Detachable rim.

929,484. Piston Packing Ring.-Ernest W. Petter, London, England. 929,503. Fuel.-George B. Selden, Rochester.

N. Y.

Claim 4. As an improved fuel for internal ignition engines, a liquid hydrocarbon containing peroxide of hydrogen and a nitro-substitution comnound, substantially as described.

929,540. Reversible Petroleum and Compressed Air Motor .- Marius Berliet, Lyon, France.

929,556. Power Transmission Mechanism. liam G. Clifton, Highbury, London, England.

929,582. Electric Current Rectifier .- Eugene Garretson, Buffalo, N. Y.

An electric current rectifier comprising a body of silver sulphide and a body of metallic oxide in electrical contact therewith.

929,588. Self Starting Device for Gas Engines. -William A. Hansen, San Francisco, Cal.

Compressed air.

929,605. Safety Steering Attachment for Automobiles.-Henry P. Larouette, San José, Cal.

929,620. Tire.-George E. Miller, Newton Center, and Carl M. Wheaton, Newtonville, Mar 929,622. Explosive Engine.-Isaac G. Neuber.

Detroit, Mich. Two cycle.

929,627. Mask for Automobile Lamps.-Harold D. Penney, Brooklyn, N. Y.

Tire Tread.-Joseph R. Sanford and 929.632. John G. Doughty, Winsted, Conn.

A tire tread having a multitude of air chambers formed within and thereon, the major portion of each air chamber being formed by walls of circular cross section.

# The Horseless Age

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### Boston as a Centre of the Motor Express Business.

By H. H. Brown.

Perhaps one of the most interesting and profitable applications of the motor vehicle in commercial work in the vicinity of Boston is in the service of regular express companies for the transportation of goods to and from surrounding towns. There are at least a dozen regular express companies which employ motor trucks to transport goods from the city to the town in which they operate, delivering and collecting at either end by single one horse wagons in most cases. The lengths of the routes vary from 5 to 20 miles, and from one to three round trips are made daily on practically regular schedule time.

Practically all of the concerns employing motor trucks for this purpose are old firms which have been in the express business for years, and which formerly employed horses in the same manner in which the motor trucks are now employed. In most cases a single truck was put on as an experiment, and after a thorough trial, in some cases of a year or more, the first order was followed by a second, and, in at least one case, by a third.

The following partial list of the towns to which motor express services run from Boston will give anyone acquainted with Boston and its suburbs a fair idea of the magnitude of the business. The figure after a town signifies the number of companies operating automobile express routes to the town from Boston: Lynn (2), Swampscott, Salem, Malden, Waltham (2), Watertown (2), Newton, Mattapan, Medfield, Quincy, East Weymouth.

#### LOAD TRANSFER POINTS.

Goods are delivered to and collected from the trucks by one horse delivery wagons in Boston, mostly at certain squares and streets, as permitted by the street traffic regulations. The principal points used for this purpose are Haymarket square, the lower end of State street, near the Custom House, and Providence street, between Park square and Berkley street, although one or two companies have intown depots at the express platforms at the North Station. In certain cases where a consignment of goods from one party to another constitutes more than a quarter of the total load of a truck. there is often a saving in time, as well as of labor, in rehandling, by direct delivery from door to door entirely by truck. The work done by the machines covering different routes varies quite a little, owing to the varying lengths of the routes and the practical limitation of the length of the working day. This may be made plainer by means of a few practical examples.

Let us take the case of Weiker's Medfield Express. From Boston to Medfield is about 25 miles, and the round trip is therefore about 50 miles. Now, considering the time taken to load and unload, it will be seen that it is impractical to make more than one round trip per day, nor is it practical to make arrangements for garaging at both ends of the line, everything considered. Hence the truck in this case is not working to its best advantage. On the other hand, take the case of Cushing's East Weymouth Express. This covers a route of from 15 to 18 miles, and makes two round trips per day. Thus in this case the mileage is from 60 to 70 per day. In the same way the length of the route alters the balance in favor of the motor truck when compared with horses, although in all cases the showing is favorable to the truck. The majority of the trucks carry from one and one-half times

to twice the load of the two horse wagons which were formerly employed for this purpose, and average from 10 to 12 miles per hour, as against not over 5 to 6 miles per hour for the horse wagons. The maximum average daily mileage of the horse wagons was not over 20, as compared with about 70 for the truck. Besides this, considerable has been saved in stable charges at the Boston end of the routes in many cases.

#### TYPES OF TRUCKS.

Thus far no electric trucks have been employed in this line of work in the vicinity of Boston, and with one exception all the machines employed are of the internal combustion type. This exception is a Stanley steamer, operated by Newcomb's Express, which runs from Boston to Newton over a route of about 7 miles. As this car is the only one of its type thus far in operation a description may be of interest. The motor is a two cylinder, double acting engine of the well known Stanley type, mounted on the live rear axle and driving the same by means of a single reduction spur gearing. The boiler is 26 inches in diameter and is mounted in front under the hood. The truck is rated at 3,000 pounds capacity, although it is frequently loaded to much more than this. It is fitted with pneumatic tires, 36x51/2 inch rear and 36x41/2 inch front. The tires now on the wheels have seen about 4,500 miles of service. The machine consumes from 12 to 15 gallons of gasoline per day, according to the load carried, and whether two or three trips are made. To offset this somewhat excessive consumption of gasoline it is claimed that very little oil is required, and that the upkeep expenses for repairs are quite low.

#### ABBOTT & MILLER'S EXPRESS.

Perhaps one of the most interesting developments of the motor express business in the city of Boston is the service of Ab-



NEWCOMB'S EXPRESS.



FOUR TON TRUCK OF THE MOTOR TRANSPORTATION COMPANY.



ABBOTT & MILLER'S GARAGE AT QUINCY.

bott & Miller, who have for years run an express from Boston to Quincy. This firm formerly employed horses. About two years ago they commenced to see the possibilities of the motor truck in their business, and it was decided to experiment with one, after carefully looking the field over.

Their first truck was used for six months. making two round trips per day, or an average of 44 miles per day. At the end of that time a second truck of the same make was purchased and the first laid off for overhauling. A third truck of the same make has recently been added to the equipment. This firm realizes that no matter how perfect a machine may be it is in the nature of things that certain parts wear out or break and require replacement, and they therefore decided to put in a repair shop and do all their own repair work, thus saving delays and considerable expense. They accordingly fitted up part of their garage as a machine shop, putting in an engine lathe, an upright drill, a shaper, a power hack and an emery wheel Besides this, there are a blacksmith's forge and an inspection pit, and electric portable drills form part of the shop equipment. A good supply of the parts most frequently worn out or broken is kept on hand, such as chains, sprockets. springs, etc. Two machinists are constantly employed in the shop. These are kept steadily employed, as it has been found that considerable outside work may be obtained. This firm, after having proven to its satisfaction that through trucking was a success, saw the possibility of making a success of delivery work right within the city. They accordingly took the agency for another make

of commercial wagon and put ten delivery wagons of this make on one of their routes. This route is 23 miles in length, and was formerly covered by a one horse wagon once per day. The motor truck makes three round trips, with an average of fifty stops per trip.

#### RESERVE STOCK RULE.

Besides the four machines used in the regular express service, a fifth machine is in use. This is made over from a two cylinder runabout, which was fitted with a small box body in the rear. This machine is sometimes pressed into service as an emergency delivery wagon, but it is mostly used as a repair wagon when some breakdown occurs to a truck, which may be mended on the road, as, for instance, the breaking of a spring. The garage of this concern is a one story building, heated by steam, with the repair shop at one side. The flooring of the main part is of dirt, although there is a concrete floored washstand to one side, One thing that has been brought out by the experience of this firm is the importance of having a reserve truck in order to have a machine to put in service in case of a breakdown or when one of the trucks needs a general overhauling.

The observations of this firm, combined with their own experience, lead them to the belief that a reserve of one machine for every five machines in active service is about the right proportion. This seems to be also the opinion of other firms using commercial vehicles of one sort or another. Another thing that has been brought out is the extreme desirability of having the machines of one make, and as far as possible inter-

changeable. This point was recently very strikingly illustrated by the following incident: One of the machines was undergoing its periodical overhauling, which, by the way, is very thorough, the chassis being stripped to almost the last nut and bolt. To assemble the machine and put it in operating condition was the work of at least a week. One afternoon one of the trucks which was then in operation broke a crank shaft. As soon as the other truck delivered its load it was sent out after the disabled one, which was then towed to the office. unloaded, and then towed to the garage. The crank shaft of the machine which was being overhauled was then substituted for the broken one, the machinists working all night. The result was that the disabled truck was in service again the next day. Had the trucks been of different makes or not interchangeable it is probable that a week's delay would have resulted.

#### SHIFTING OF LOADS.

While most of the express companies have depots or stables in their towns where the loads may be shifted from the motor trucks. either to a loading platform or directly to the delivery or collecting horse wagons, only a single one of the companies has a Boston depot. In most cases the shifting of loads is done directly from the truck to the horse wagon, and vice versa, on certain streets and squares, as permitted by the traffic regulations of the city. The principal points where this is done are as follows: The Malden Auto Express and Nally's Watertown Express do most of their shifting on Haymarket square; Abbott & Miller do their shifting at Post Office square, Probably the principal point of load transference is at the foot of State street, near the water front; here Weiker's Medfield Express, who cover one of the longest routes, do most of their shifting, as well as Hapgood's Lynn Express. This point is also the principal point for the shifting of the horse drawn loads, and at almost any time of the day at least twenty wagons may be seen shifting their loads or waiting to receive or discharge a load. Providence street is quite a centre for the shifting of loads of those expresses doing business to the south and west of the city. Among these are Newcomb's Newton Express and Jenkin's Mattapan Express. This concern has had a Packard two cylinder truck in service for about a year. This was perhaps the first truck of this make which was used



HAPGOOD'S LYNN AND BOSTON EXPRESS.

in the city, having been used by a wholesale furniture house for about three years and disposed of by this firm in order to buy a larger and more powerful truck of the same make. This fact is interesting, as giving something of a line on the wearing qualities of a good machine.

A few firms make use of the express platforms at the North Stations for the shifting of their loads. These are mostly firms which do considerable railroad work. Among them are Gibb's Waltham Express and Eaton's Wakefield Express. Both of these firms have but one truck in operation, and depend to a certain extent on the railroad for their through hauls,

#### THE MOTOR TRANSPORTATION COMPANY,

The business of the Motor Transportation Company is quite interesting in many ways, as it has many points of difference from the regular motor express business around Boston. In the first place, the home office of this company is Boston, and they have a depot located at their office at 259 Atlantic avenue, where the horse drawn tels direct. It has been found that it is possible for this truck to pick up a return load of shoes and other merchandise at Lynn. Twice a week a truck runs from the Boston depot of a spring water concern to their spring, situated in Lexington, Mass., a run of about 10 miles, carrying out the empties and returning with full carboys of water

Many movers of safes, machinery, furniture and bric-à-brac, the proper moving and packing of which is almost a trade in itself, have begun to realize the possibilities of extending their business to the long hauls made possible by the motor truck, but for various reasons they do not feel justified in investing capital in machines of their own. This firm stands ready to let its truck for this sort of service, furnishing the same with driver for a flat rate per day. Many firms have already availed themselves of this service, to the mutual advantage of both parties.

Outside of the regular express business, there are at least three firms who make a

Io o'clock in the morning, and a grand piano was lowered from the third story window into the 3 ton truck. Then, with the assistance of the packers, both trucks were loaded and ready to start at about 12 o'clock. The two truck loads would have made at least three two-horse loads. The machines were able to run to Ipswich, deliver their loads and return to Boston the same night, ready for another job the next day.

To do the same work three horse teams would have been required. It would have been necessary to have left them over night at Ipswich, the whole next day would have been taken up in returning to Boston, and it would certainly have been advisable to have laid off the horses for another day to rest them up.

Thus it will be seen that two motor trucks in this instance were able to do three times the work of three two horse teams. On the other hand, if the shipment had been by rail, it would, of course, have been necessary to pack much more carefully and thoroughly, and the goods would have had



WARNER & Co.'s Two Trucks Loaded for a Trip to Ipswich.



MALDEN AUTO EXPRESS TRUCK LOADED AT HAYMARKET SOUARE.

wagons deliver and collect the loads from the trucks. Again, this company was organized only quite recently for the purpose of doing an auto trucking business, but it is under the management of experienced, practical express men. At present the company have four Alden Sampson trucks in operation, of 4 tons capacity each. As far as could be ascertained, these trucks are the heaviest so far used in the express business around Boston, none of the other makes being rated at over 3 tons, while these are very conservatively rated at 4 tons. The motors are rated at 40 horse power, having four 5x51/2 inch cylinders. This company does not confine itself to any one line of the express business, although it runs a regular line from Boston to Lynn. making two trips daily, for which one car is amply sufficient.

# SERVICE TO SUMMER HOTELS.

During the summer it was found that quite a number of the wholesale provision dealers have shipments to make to four large summer hotels located at Swampscott, Mass., which is the next town beyond Lynn. As the daily shipments to these hotels amount to a full load all told, during the four summer months one truck is run to the hotels once per day, delivering to the ho-

specialty of furniture moving by motor truck in the vicinity of Boston. For these long hauls a flat rate is made which includes loading and unloading, but does not include special moving, such as pianos, etc., and packing. The rate is \$1 per mile. Among the firms doing this class of business are H. L. Kincade & Co., of Quincy, who have a 3 ton Frayer-Miller truck, which is used for delivery work in their regular furniture business, as well as for long distance hauls.

FURNITURE MOVING.

Warner & Co., whose main business is packing and shipping, and who formerly had their transportation done by others, have recently taken up the motor truck for their service. About the 1st of March they put a 11/2 ton truck into service, and they have recently added a 3 ton truck to their equipment. Perhaps a specific example of a job will show what the motor truck can accomplish in this line of business. It was desired to move the furniture and contents of a large housekeeping flat from Boston to Ipswich, a town 25 to 30 miles from Boston. It was, of course, necessary to pack much of the crockery, glassware, etc., very carefully. This was attended to by the packers employed by this firm at a flat rate per man per hour. The teams were on hand at about to be handled twice, thus increasing the risk of breakage.

This is by no means an extreme case, as this same firm has carried a load under similar circumstances to New Bedford, which is between 50 and 60 miles from Boston.

### OPERATING COST.

The average consumption of gasoline on the gasoline trucks is at the rate of I gallon per 4 to 6 miles. A gallon of lubricatnig oil lasts from 80 to 90 miles. Most of the concerns operating trucks are of the opinion that these items are so small as to hardly warrant the keeping of a very accurate account, and that the real item of expense is the cost of upkeep, including the cost of tires, broken springs and worn chains and sprockets. The drivers of these trucks are almost entirely recruited from the ranks of the old express wagon drivers, although in some cases specially trained chauffeurs are employed. With very few exceptions all the machines are fitted with either sliding or selective gears, giving three to four speeds ahead. The two speed and reverse planetary has certainly lost considerable ground for this kind of work. Not only that, but the drivers seem to fully appreciate the advantages of using the different speeds

and change them fully as frequently as is advisable.

Perhaps the growth of the business around Boston is largely due to the activity of the agents for one make of truck, who have seen the possibilities of the business and have had the courage of their convictions. This concern formerly was and still is in the manufacture of carriages and wagons, and its members enjoy a wide acquaintance among the express companies in the vicinity. They were able to see what

was wanted, and when the machine came along that they thought was right for their customers they did not hesitate to secure the agency for it and recommend it. Then, after having sold the truck they placed themselves in such a position as to keep their customers satisfied, doing repairs and furnishing replacements promptly, and making moderate charges. The result has been that this firm has almost a monopoly of this line of business in the vicinity of Boston.

# Self Regulating Dynamos for Auto Lighting and Ignition.

BY ALBERT L. CLOUGH.

Now that electric lights have come to be so largely used upon motor cars, there is a decided tendency toward the installation of small direct current dynamos for the purpose of continuously recharging the accumulators required to feed the lamps and sometimes frequently to operate the ignition system as well. A generator delivering a nearly constant voltage, independent of the very wide speed fluctuations of the gasoline motor which drives it, is necessarily required. The centrifugally actuated flyball governor, controlling a friction clutch pulley? has been largely used to maintain the generator speed constant, despite the fluctuations of speed of the car motor, and there has also been slightly used an automatic field rheostat, so arranged as to weaken the generator field current in proportion to the increase of speed and vice versa. In order to accomplish this a centrifugal governor is so arranged as to cut into or out of the field circuit a series of resistances when the speed rises or falls. When this arrangement is correctly proportioned the increase in voltage which would be occasioned by a certain increase of speed may be very nearly counterbalanced by the decrease in voltage occasioned by the weakening of the field, which is brought about by the resistance automatically added to the field circuit by the centrifugal governor's movement, due to the rise of speed, and the e. m. f. delivered is thus kept reasonably constant.

It is not unlikely, however, that automatic mechanical devices, such as these, which involve moving and wearing parts and a certain degree of complication, may ultimately be superseded by regulating tendencies inherent in the generators themselves, and due to special features of design.

Inherent regulation of a direct current generator may be favored to a considerable extent by a proper proportioning of copper and iron in armature and field, and by properly predetermining the degree of saturation of the iron, but in the production of a constant voltage, variable speed generator, advantage is sometimes taken of the phenomena of armature reaction. This is done in the case of one small shunt wound bipolar machine designed for vehicle lighting. The

in involved is crudely illustrated in ompanying diagram, Fig. 1.

#### AUXILIARY BRUSHES.

Two sets of brushes are used, of which a > 15 the main pair. These bear upon the commutator in the usual position for nearly sparkless operation, that is, at or near the neutral points. Brushes cd are an auxiliary pair which touch the commutator on a diameter nearly at right angles to the main brushes. They are, however, not exactly upon this diameter, but are displaced appreciably in the direction of rotation of the

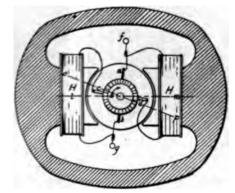


FIG. 1.—INHERENT DYNAMO REGULATION OF VARIED SPEED,

armature. The shunt field circuit is as follows: From one of the main brush leads, near f, it goes through one of the field spools H, and thence to auxiliary brush d, through the armature windings to the other auxiliary brush c, thence through the other field spool H, and finally connects to the other main brush lead near the service binding post g. The auxiliary brushes thus bridge between the two field spools. If c and d were set exactly upon a line at right angles to the line joining the neutral points, at or near which the usual brushes of a bipolar machine are set, there would be no effective voltage acting between them, for the voltage generated in the upper half of the armature would exactly counterbalance that generated in the lower half. If the auxiliary brushes are placed on one side of this perpendicular to the neutral axis, a voltage in a certain direction acts between them, the amount of which depends upon the angle of displacement, and if these brushes are set upon the opposite side of this line the voltage between them acts in the other direction.

The armature and field of this machine are so proportioned that there is a very strong armature reaction; that is, as the current builds up in the armature the magnetic field, which it produces as it circulates in the armature conductors, tends very strongly to shift the field due to the field magnets, with the result that the neutral axis tends to rotate in the direction of rotation of the armature.

#### PRINCIPLE OF REGULATION,

At very low speeds, when the tendency is for the armature current to be low, the auxiliary brushes have a lead in advance of the line perpendicular to the neutral axes *l m*, and a certain voltage acts between them. The connections of the auxiliary brushes to the field circuit are so poled as to cause this voltage to act in the same direction as the main field exciting voltage, and thus to assist in energizing the fields. The result is that when the armature is turning at very low speed the field excitation is very much greater than it would be if the auxiliary brushes were not used, and the voltage very much nearer the desired value.

As the armature speeds up there is a tendency for its current to increase, and increased armature reaction results. At a certain point of speed increase, the line 1 m has rotated until it passes through the brushes cd. Under these conditions no voltage is acting between c and d, and they have no effect upon the excitation, the generator operating on simple shunt excitation. As the speed is still further augmented, and the armature current tends to increase to a higher value, the neutral axis is still further rotated and line I m assumes a position such as o p. Now there is again an effective voltage between brushes c and d, but, as previously indicated, it is in the opposite direction from previously, and now tends to oppose the regular shunt excitation. Despite the high speed, the reduction in field strength is sufficient to hold down the working voltage to a very much lower value than it would have if the auxiliary excitation were not provided. The higher the speed the greater the shifting of line op in the direction of rotation, the greater the opposing voltage between c and d, and the greater the weakening of the effective field. By a proper setting of the lead of brushes c and d the regulating effect can be increased or decreased, and quite wide variations in speed can be very nearly overcome.

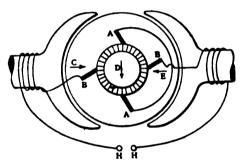
If the evil effects of sparking at the main brushes can be minimized, this arrangement should be of value, as it effects regulation without moving parts, and can always be depended upon so far as it goes.

ANOTHER METHOD OF REGULATION.

Another method of regulation, which has been evolved to secure a constant current through a constant resistance, at widely variable speeds, will here be described, in principle (Fig. 2). This also depends upon armature reaction. To secure the desired results an armature of large iron content and rather heavily wound is used, and the field magnets are of quite small iron section, but

heavily wound with series coils so that they are saturated readily. The pole pieces, on the contrary, are massive and embrace a large polar arc. The brushes A A, which are set as are the main brushes of an ordinary bipolar generator, are here the auxiliary brushes, and are connected together, thus short circuiting through them the armature winding. Brushes B B, which are set on a diameter nearly at right angles to brushes A A, become in this generator the service brushes, and furnish the working current to binding posts H H, through the series fields.

The condition of the magnetic circuit is somewhat more involved than in an ordinary generator. The field coils set up a flux in the ordinary direction from pole piece to pole piece in the direction denoted by the arrow C. This is cut by the armature conductors, which are short circuited by the brushes A A, and currents circulate in the two halves of the armature winding exactly as they do in the armature of an ordinary generator, and produce a cross magnetic flux corresponding to the cross magnetization due to ordinary armature reaction. As the volume of the short circuited current is large, and as the pole pieces are



INHERENT REGULATION FOR VARIABLE SPEED.

very susceptible to it, the cross magnetic flux in the direction of arrow D becomes a very important factor compared with what it is in a machine of usual construction.

The armature conductors in their rotation cut this cross flux D, and a current is induced in them, which is taken off by the working brushes BB to the fields and the external circuit. This current, flowing through the upper and lower halves of the winding, tends also to magnetize the armature core and the pole pieces, and the direction of this flux is along arrow E. That is, this field, which is produced by the armature reaction of the working current, directly opposes the field due to the field magnets. This brings about a very unstable condition of the effective field, which gives rise to the working current. Remembering that the field magnets are of very small cross section, and heavily wound, it is plain that they reach nearly their full saturation before the normal output is attained. The pole pieces and armature core being massive, these parts are at a low density, and an increase of current in the field coils has little influence upon them. Changes of current in the armature acts, however, very powerfully upon these parts at their relatively low degree of saturation

If the machine is working normally and is suddenly speeded up, the cross field due to the currents short circuited by brushes A A increases, and there is a tendency for the armature conductors cutting this field and furnishing current to the working circuit to increase. Upon such a slight increase occurring, its armature reaction along arrow E instantly increases, and the resulting flux tends to counteract and reduce the field magnet flux C, which latter, being diminished, causes a diminution in flux D, and a lessening of the current produced by it in the working circuit. The rise of current in the working circuit is thus limited to a very small value.

A diminution in speed produces actions opposite to those above described.

On account of the small mass of iron in the fields and the large number of field turns, the machine "builds up" to a working condition at quite low speeds.

By shunting a portion of the working current away from the field coils, regulation to varying current strengths can be attained.

# Methods of Providing Against Torque Reaction.

By F. E. WATTS.

In all shaft driven cars there is a tendency, when starting forward from rest, for the rear axle housing and propeller shaft to turn backward. When the hub brakes are applied while the car is moving their reaction tends to turn the axle casing forward. These "torque reactions," as they are commonly called, must be resisted by some member or members fastened to the axle in a sufficiently rigid manner to prevent it from turning out of its usual position more than a limited amount.

Three methods of taking this torque reaction are at present in vogue. Where only one universal joint is used the propeller shaft is commonly enclosed in a tube, and this tube takes the torque. The forward end of the tube is usually fitted with some kind of a universal joint arrangement which secures it to the frame. Thus the torque is transmitted from the rear axle directly to the frame. When the brakes are suddenly applied or the clutch is thrown in abruptly the torque reaction rises to its highest value. It is then imperative that the torsion member be very strong or have some provision for yielding slightly under an excessive stress. In the construction just described the tube must be made strong enough so that it is too rigid to yield any perceptible amount. The only way in which deflection can take place therefore is by compression of the springs in the case of brake application, and by the lifting of the car and passenger weight when the clutch is thrown in.

## SPRINGS AS TORQUE MEMBERS.

This method of taking torque reaction is quite generally used in the smaller cars, but when the motor is much over 30 horse power the stresses become so great that most designers prefer to adopt some other construction.

In quite a few of the smaller cars the torque tube ends just at the rear of the universal joint, and a ball or roller bearing is placed at this point. The torque reaction is then carried by the universal joint. While this construction would seem to be more faulty than the last, from a theoretical standpoint at least it appears to give good service in practice.

For the more powerful class of machines two universal joints are commonly used. The joints are ordinarily enclosed, but the connecting shaft is left bare. A separate torsion member is provided. This has quite commonly consisted of a tube with a ball joint at its forward end, the socket for this ball being secured to a cross member of the frame. The socket is commonly carried in a tubular case between helical springs, so that no matter in which direction the stress comes one of these springs deflects and prevents excessive stresses in the torsion member and transmission parts.

PRESSED STEEL TORSION MEMBERS.

The present tendency is to use torsion members of pressed steel rather than tubular ones. They are usually made of narrow channel section with lattice web, very deep at the rear end and tapering to the end which joins the frame. Sometimes the torsion member is made from two tubes with their rear ends attached to the top and bottom of the driving gear housing respectively, and their front ends joined so that they form a V. Either of these last two constructions gives a light and strong torsion member, but their front ends must be spring supported, as when a single tube is used.

The third method of taking torque reaction is the simplest, and may be the best for certain classes of cars. It consists in making the springs fast to the axle and also to the frame, and letting them take care of the torque reaction as well as the spring support. The propeller shaft is, of course, fitted with two universal joints. Where this is done there must be a very perceptible deflection of the springs when the brake or the clutch is suddenly applied, and this deflection must greatly reduce the maximum stresses in the transmission parts.

While this construction has been used by only a few makers in this country and abroad, they are representative concerns whose practice it is well to watch. It is being used with apparent success on some very powerful cars, and it would seem to permit of a lighter car for a given maximum stress in the transmitting parts than any other construction. It will be interesting to observe whether the circle of adherents of this construction increases.

We would be glad to have any of our readers give their experiences as to the relative amount of wear in the universal joints with different types of construction.

The seventh annual automobile show in Turin, Italy, is to be held April 3 to 24, 1910. The show will again be held in the Valentino Park, and will comprise a motoragricultural and an aerial section.

# Machining an Auto Engine Cylinder.

BY JAMES McIntosh.

The auto cylinder is subjected to more severe usage than any casting in any other line of work. In the first place, in the usual single acting engine one end is exposed to the heat of explosion while the other remains cool. The excess heat that must be carried off in order to make lubrication possible may be disposed of either by a water jacket or by air cooling ribs or projections. We will assume that we have an outline of the interior of the cylinder bore and the valve seats. These are the only surfaces that affect the proper working of the cylinder, and they should be perfect and maintained so under working conditions. However, the best that can be done is to make conditions as favorable as possible.

The bore and valve seats must be connected to each other in such a manner that the connecting passages do not affect the surfaces in question, and that the intervening metal does not distort the one or the other or both under working conditions. Among the questions that arise in this connection are the following: How can we keep the temperature the same at all points of the bore? Can any form of water jacket be devised that will evenly cool a single acting cylinder? At what point on the bore should the jacket terminate? Will the point where it does end tend to affect the bore? Can the thickness of metal be varied to properly conduct the excess heat generated? Any possible solution of these problems is only a makeshift at best.

VARIOUS METHODS. The machining of a cylinder is a difficult problem, even with the most careful design. Some claim that they grind the bore, and that that is the only way to get a true bore. Some claim that the casting should be annealed either before machining or after it has been roughed up, and previous to grinding, while others claim to get results by the aging process. There are also some who claim that the only way to finish the bore is by reaming. They claim that the fine particles of emery lodge in the grain of the metal and cause undue cutting of the piston. I doubt if the process can be condemned on that account, but where loose emery is used to lap the cylinder and piston rings to a fit, there is some chance for this trouble to occur. The writer knows of a test made with locomotive slide valves to compare the results of scraping with that of grinding the valve and cylinder faces. On one side of the locomotive the cylinder and valve were scraped in the usual manner by hand, while the surfaces on the other side were fitted by grinding the valve in place with fine emery between the faces. Every precaution was taken to make the experiment a success, as the grinding process was much quicker and cheaper than the old method of scraping. After the locomotive had been put on the road the steam chests were at intervals opened to note

the condition of the two faces. The final result was that a return was made to the old process of scraping, as the cylinder and valve on the side that was ground were decidedly rougher and scored, and it was reasoned that this was due to the particles of emery imbedded in the surfaces, while the valve on the other side had the usual surface obtained by the old process. The above method can only be compared with the lapping process, and it is not intended to show that where grinding is resorted to the results obtained must be bad, for if the surfaces on the locomotive cylinder and slide valve had been finished on a surface grinder the result obtained would have been dif-

#### TEMPERATURE AFFECTS CYLINDER.

Much study has been given to the subject of boring, with the object of improving the quality of the work and increasing the output. I am sure all will agree on the point that where speed is desired and the roughing cuts are forced to the limit, the heat generated by the cutters does disturb the bore somewhat, and if the bore is finished at one setting it will change when the cylinder cools off. That may mean that the cylinder will be more perfect under working conditions than one that has been ground after annealing, aging, etc., have been resorted to.

### ROUGH BORING.

The method in use to rough bore fast and save time with the first cut is to use a stiff bar (slightly smaller than the rough bore, to allow for irregularities and cuttings) into which are inserted a series of cutters I inch or more apart, the entire length of the bar. These cutters are arranged with suitable mechanism to set them out or draw them in. The method of using the bar or roughing tool is to draw in the tools, run the bar into the extreme or head end of the cylinder, then feed the tools out so as to cut grooves in the cylinder bore. If the tools are spaced I inch apart the amount of travel necessary to remove the stock would be just I inch. For instance, if the length of bore were 10 inches and the bar had ten tools I inch apart, the rouhing cut would be completed with I inch of travel, or ten times faster than if a bar with one set of tools traveling to inches were used. The number of cutters spaced around the circumference is, of course, optional. I prefer an even number of cutters, mainly for the reason that this permits of calipering the diameter, which cannot be done with odd numbers. Further, if the number of cutters is the same in all heads, any irregularity with the first rougher will be taken up in the second and third cuts, but if we should use for the first head four tools, the second six and the third eight, the chances are that the one will not mesh with the irregularities of the other, and they will tend to eliminate the defect of the former by absorption of the cut with a cutter having more points out of mesh with each cut, while all can be sized readily. To those who finish by reaming the advantages will be apparent; and to those who finish by grinding the result will be the same.

#### GRINDING VERSUS REAMING.

As to the advantages of grinding over reaming in finishing the bore of a cylinder, there are at least two that are important. First, the cylinder can be given a smoother surface by grinding than by reaming, and less time is required by the former process. The reamed cylinder would have to be "run in" either at the factory or by the owner of the auto. It is also safe to assume that if the original pistons and rings are used the necessary "wearing in" to the point where the engine runs at its best occasions considerable loss of power and expense in overcoming the extra friction. Second, all who have had to do with reamers know that it is next to impossible to keep them to size, especially if the output is great. With the grinding process that difficulty is not encountered, and cylinders can be bored to standard sizes, so there is no need for fitting pistons to cylinders. I have seen it claimed as an advantage of the reamed cylinder that the surface will retain oil better than that of a ground cylinder. That I do not doubt, but I contend that if the bore were finished to a glass hard and smooth finish it would not need as much oil, and would not cut so readily. If the surfaces are smooth grit cannot get a hold.

There is another point regarding the finishing of cylinder bores. If the thickness of metal is not regular the bore will not be regular when hot, whether the bore is finished by one method or the other, cold annealed, seasoned, or according to any other process. The conditions are especially bad in twin cylinders where one cylinder is finished while the other is yet in rough state. En bloc construction makes things still worse, and such cylinders where the exhaust pipes are a part of the cylinders cannot possibly keep straight under working conditions.

### BORING TWO CYCLE CYLINDERS.

The boring of two cycle cylinders is a particularly difficult problem. The ports are usually a source of trouble, and grinding has been suggested as the only way to finish such a cylinder, but anyone who has had the opportunity to make observations will be convinced that grinding does not give perfect results. Where the metal is uniform around the ports better results can be obtained by the reaming process, finishing while the heat of the roughing cuts still affects the bore. It would seem that a cylinder finished by grinding after it has cooled off will develop high spots under working conditions, while one that is reamed while hot will not. At least that has been my experience with two cycle motors, and the same thing will occur with the usual four cycle cylinder, to some extent.

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# Public Speedways Proposed in England.

Sanguine writers on automobile topics have repeatedly in the past suggested the idea of wide, straight, dustless roads built specially for automobiles, on which cars could be driven at any desired speed, but it remained for the British Minister of Finance, Lloyd George, to take the first step to put the idea into effect. He has introduced in the House of Commons a bill which provides essentially for the construction of special exclusive automobile roads or speedways throughout the country.

Perhaps in no country has there been so much friction between motorists and the general public over speeding, dust raising, etc., as in England, if the extensive operation of speed traps and bitter controversies in the press are reliable criteria. It seems that Mr. Lloyd George set himself the task of ending these differences. Realizing, no doubt, that a good deal of the public animosity toward motorists is based on jealousy, he set out by proposing an increased tax on automobiles and a tax on all fuel used in automobiles, except those engaged in public service. As might have been expected, this

bill aroused a storm of protest from motorists and the motor industry, notwithstanding the fact that it was provided that the proceeds of the new taxes should be used for road improvement purposes. This clause, it seems, did not appease the motorists in the least, as it was intended to, and the objections to it have become even more pronounced now that it is known in precisely what way the funds thus to be raised are to be applied.

The majority of automobile users will hardly care for these specially constructed speedways. Automobiles are coming to be used more and more as utility vehicles; that is, for making trips to particular points, instead of simply for enjoying the motion, the open air, etc., and to those who make use of their cars in their regular pursuit the speedways would seldom be available, as it is, of course, inconceivable that these special roads would be built on such an extensive scale as to parallel practically every public road.

It is, no doubt, true that a road built exclusively for self propelled, rubber tired traffic would be built quite differently from the modern macadam road, which latter system of road construction was developed to meet the requirements of horse drawn, steel tired traffic. Automobile roads would probably have less substantial foundations, but smoother, harder or continuous surfaces. As the automobile traffic on roads increases and horse traffic decreases proportionately, the regular roads will, no doubt be provided with surfaces that are better suited to automobile traffic. The enormous sums that would have to be spent for even special main roads for automobiles could much more profitably be invested in the improvement of existing roads, in dust treatment, elimination of hidden turns and grade crossings, grading or proper banking of dangerous curves, etc. We notice that an opposition movement to Mr. Lloyd George's proposal has already been launched in England, and consider it very doubtful whether his plan will meet with much support in Parliament.

# Is the Spare Tire Superfluous?

The necessity for constantly carrying, as a part of the emergency equipment of a car, one or more spare tire shoes is rather an objectionable one.

Not only does this extra equipment often interfere with getting into and out of the car, but casings are not infrequently stolen at times when the car is left unattended.

They also deteriorate to a certain extent in the long period during which they may be carried about, and, of course, add a perceptible weight.

The matter of carrying spare casings has recently been called to mind by the statement made by one of the most conservative American automobile manufacturers to the effect that it is no longer necessary to carry such extra shoes upon his cars.

Upon the cars of this particular make, which are noted for their light weight and effective springing, tires of very much larger section than generally supplied for the same supported weight are provided, and the casings are thus worked at much less than their rated safe carrying capacity. This amounts to the provision of a considerable factor of safety against blowouts.

A growing tendency to equip cars with tires of larger cross sections than those which barely suffice to meet the recommendations of the tire manufacturers has been noted in these columns, and it is an interesting fact that a large proportion of this season's purchasers of several well known makes of medium or low priced cars, embodying 3½ inch tires as regular equipment, have chosen to have their machines fitted with 4 inch tires at extra expense. Not a few such owners have operated their cars successfully during the earlier use of their tires without carrying spare shoes.

Whether tires of extra large section in proportion to their load are fitted, or whether a spare casing is carried, one, of course, pays for the security thus obtained; but it is a question whether a greater degree of security cannot be obtained for the money expended by the former than by the latter course, all things considered. An equipment of tires of extra liberal size is undoubtedly quite an effective form of insurance against delays due to tire troubles, other than punctures, while an equipment of tires rather stinted in size, even though spares are carried, still involves a decidedly greater risk of involuntary stops upon the road.

With the further improvement in tires which may be hoped for, resulting as it will in less frequent premature failures, and with the growth of the use of the blow-out patch as an emergency device, it may well be that the custom of carrying spare casings may safely be discarded, except where touring in remote districts is practiced, and in the case of cars of such weight that tires large

enough to furnish a liberal factor of safety are unobtainable.

## Noiseless Engine Auxiliaries.

In the attainment of noiselessness in the operation of modern cars no details are too small to be overlooked by the careful designer. After every precaution has been taken to remove all preventable sounds emanating from the motor itself, the auxiliaries become objects of attention in this regard.

Recently the circulating pump, when of the gear type, has been subject to improvement in this direction. It has been found that the spur gears used in these pumps lacked quietness, and in several of the most refined designs noiseless herringbone gears have been substituted therefor.

Radiator fans have been found in many instances to contribute substantially to the noise of the power plant, and very careful attention is now paid to the shape of the blades, the running balance thereof and the securing of a high degree of rigidity. Certain shapes of blades set up an altogether unnecessary volume of sound, and, if balance is not looked out for, a noisy vibration results at certain speeds. Rigidity is now secured by ribbing the blades and fastening their tips together by means of a guard ring, which also serves the purpose of making less disastrous an accidental contact with the moving fan.

While much of the noise arising from the auxiliaries has been obviated by the provision of fibre or other non-sonorous gears in their drives, there is sometimes a perceptible sound arising from the flexible coupling commonly used to drive the magneto from the auxiliary shaft, subjected as it is to rapidly recurring fluctuations of torque. Even this seemingly minute source of noise is considered and taken account of in the design of the flexible joints used.

It hardly seems possible, at first thought, that the slight noise arising from the speed-ometer flexible shaft and driving gears should be perceptible among the other sounds incident to the operation of a car, but so nearly silent have modern cars become that the speedometer sounds are often clearly and sometimes objectionably apparent. Among speedometer makers the reduction of these slight sounds has become a matter of substantial importance, and so fastidious have car users become that the quietest speedometer drive has become a distinct desideratum.

 indeed, has been the success atapproximating to noiselessness of operation that should the present type of poppet valve gear be displaced by some rotary type, the automobile might be expected to become an almost absolutely silent vehicle.

# Dealers' and Salesmen's Conventions.

The practice adopted by the larger and better established automobile manufacturers of calling together their salesmen, district managers, agents and repair men, at the home factory, to inspect and receive instructions concerning the new models, is quite common this season. That the custom is an excellent one can hardly be doubted.

The industry has always suffered more or less from a lack of intelligent co-ordination betwen the manufacturing and the selling departments. Agents have too often been less well versed in the details of the construction and characteristic points of the cars which they were handling than the good of the business demanded, and, at the same time, the factory men have not always been in close enough touch with the outside forces to obtain a just idea of the status of their product, from the dealers' standpoint, which reflects very closely the opinion of the general public.

A meeting of the manufacturing and selling forces of a company at the factory not only tends toward a healthy esprit de corps among all concerned but assists in consolidating the entire organization into a more effective instrument for building and vending automobiles acceptable to the public.

Held, as these meetings usually are, very soon after the model cars for the coming business season have been formally adopted, the conditions are very favorable. The visiting agents, dealers and repair shop men can see and note the performance of the new cars, the parts can be observed going through the factory in their various stages, and the engineering and production departments may be trusted to leave no point of the cars unmentioned which a salesman or repair man may profitably know. The selling force is able to report most fully, upon such an occasion, as to the tendencies observable in the buying public, and to call the attention of the factory to any shortcomings or to possible improvements which may be made.

The automobile industry being a comparatively new one its internal organization has not been so far perfected as that of older lines of business, but anything which tends toward a closer and more intelligent understanding and co-operation between the productive and the selling ends leads toward the ability to do business more effectively and economically and with less friction.

### Good Roads Activity.

The second annual good roads convention of the American Automobile Association will be held in Cleveland next week and about a month later the American Road Makers' Association will hold their annual meeting at Columbus, Ohio. There has recently been considerable activity in the organization of good roads interests, and during the coming winter large appropriations will very likely be made by many State legislatures. As roads have to be built with State and county funds, it appears that State organizations can do the most effective work in urging appropriations and arousing public interest in the subject, and it is therefore a matter for congratulation that State roads federations are now being organized. While the Cleveland convention will be held under the auspices of an automobile organization it will be attended by official delegates of many States, and even the National Government will be represented by Director Page, of the Bureau of Public Roads. Besides the motorists, that other great body of road users, the farmers, will also be represented by ex-Governor Bachelder, of New Hampshire, president of the National Grange. The motorists and the motor industry want improved roads badly, and we do not believe that a single voice would be raised among them against appropriations of almost any amount for road building so long as it was fairly certain that the moneys were actually being expended for the purpose in a businesslike way. The farmers also realize that they would be benefited by good roads, but many among them seem to doubt whether the benefits to be derived warrant the cost. If these doubts can be dispelled, and the whole farming community can be enlisted in the cause of good roads, then we believe the construction of roads will be limited no longer by limitations of funds available. but simply by the number of laborers and teams available at reasonable rates.

According to a recent decision of the Minister of Finance of Colombia, South America, bicycles and motor cars are dutable according to the second class of the tariff schedule, without the 70 per cent. tariff majoration.

# Electric Cradle Dynamometer-Method for Test of Gasoline Engines.

(Paper read by H. S. Baldwin before the Chicago Meeting of the Society of Automobile Engineers .- Condensed.)

When the early electric motors were being developed, about 1884-86, it is recorded that the cradle dynamometer was devised by Professor Brackett as a more accurate means for ascertaining the "stray power" factors than the Prony brake, and since this form of dynamometer consisted essentially of a cradle upon which was mounted the electric motor to be tested, there can be little doubt as to the approximate date of its origin.

It should be explained that the early Brackett dynamometer, while embodying the principle of the modern cradle type, differed in that the motor under test was supported bodily in a framework which was free to rock through an angle sufficient to permit measurement of pull at the end of an arm. A leather belt was employed to transmit power from the motor pulley to a line shaft. It will readily be seen that this method would be awkward and impracticable for the test of gasoline engines. The principle was correct, and the only change necessary was to consider the electric motor as a generator to be used for loading the engine, which is connected by means of a flexible coupling to the shaft rather than by a belt.

In designing electrical apparatus there are many comparatively small factors such as brush friction, bearing friction and windage, I2R and iron losses, each of which has to be carefully considered in order to obtain machines of high efficiency. All this called for greater refinement in making power measurements than had before obtained, and the cradle dynamometer was found to have the required nicety. Manufacturers have continued to use the cradle dynamometer, modified and improved, for so called "special tests" in studying the characteristics of new motors and generators.

It may be asked what are the peculiar advantages of this form of dynamometer.

First-All variable factors are entirely eliminated, and it is only necessary to read the pull of the brake arm and note the rotative speed.

Second-Load can be held steadily at any desired point within the limits of the dynamometer, for an indefinite time.

Third-This dynamometer is of the absorption type, but the load is dissipated in a suitable rheostat at any desired distance from the dynamometer, which itself only reaches moderate temperature.

Fourth-The cradle dynamometer can be used to measure transmission losses, friction of bearings or other mechanical parts, and the effect of various lubricants.

Fifth-As applied to the test of gasoline engines it may be used for starting the engine.

Some may consider that a well designed water brake has most of the advantages above set forth, but it is certain that the electrical construction presents the greatest possible simplicity. In this, as in all matters, it will undoubtedly be a case of "survival of the fittest."

Commander Krebs, of the Panhard, & Levassor Company, appears to have been one of the earliest users of the cradle dynamometer for testing gasoline automobile engines, and several members of this society have made use of it for a number of years with success.

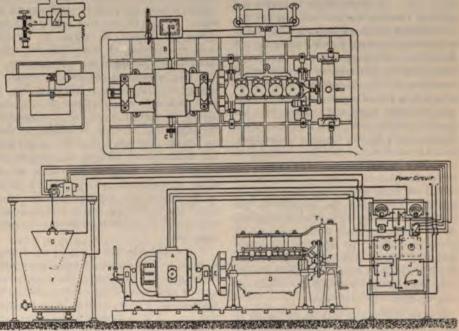
The following is a description of a cradle testing outfit laid out by the writer some three and a half years ago (Figs. 1, 2 and 3) for the test of a four cycle gasoline engine. Excellent records were obtained and a somewhat detailed description may be of interest.

So far as ultimate results are concerned, the generator forming the dynamometer may be suitable for any electric circuit. either alternating or direct. It happened that the line available was of direct current, and it was, therefore, only necessary to choose the type of generator, series, compound or shunt, and whether to use commutating poles or not. The series machine was eliminated owing to the low resistance of its field, requiring high exciting current and consequent loss in cutting down the potential of the line. Again, since it was decided to separately excite the field there was no particular advantage in the compound winding, and its more complicated construction led to the adoption of the shunt type. Here the field resistance is high with low current, or the reverse of conditions

found in the series generator. The onestion of use of the commutating pole generator was considered, but it was decided that it was not required, since the strength of field could be adjusted to the load and speed of engine so as to secure good commutation. There is no objection to commutating poles, except added first cost, and, while experience shows that they are not essential, they undoubtedly tend to better commutation under extreme variation of load. This statement is made as the service conditions of an engine dynamometer may be severe.

The generator chosen was of 20 horse power with six poles shunt wound, and its successful operation over a period of several years proved the correctness of its selection. No difficulty was found in varying load on engine between 5 and 35 b. h. p., and the latter load could be maintained for two hours or more at rated speed of about 1,000 r. p. m. without overheating the dynamometer. For a short period of time it was found that the load could be increased to 40 b. h. p.; also that satisfactory readings could be made at the other extreme of about 5 b. h. p. No attempt was made to reach higher or lower points than these, but if desirable this could undoubtedly be done. Obviously there is no limit to the size of generator, and it may be of small capacity for "stray power" readings of electric motors, or of sufficient capacity for the largest gasoline engines. Care must, therefore, be exercised in the choice of rating of the generator so that it will be suitable for the power range for any particular engine.

The next step was to machine the magnet frame on the outside and adapt the bearing heads to fit large annular ball bearings to carry the weight of the complete machine



ARRANGEMENT OF APPARATUS FOR ELECTRIC CRADLE DYNAMOMETER.

A, electric cradle dynamometer; B, lever arm; C, adjustable counterweight; D, gasoline engine; E, flexible coupling; F, water rheostat; G, movable electrode; H, motor to control movable electrode; I, double pole double throw switch; J, starting rheostat; K, overload circuit breaker; L, ammeter; M, voltmeter; N, double pole double throw switch for reversing H; O, dynamometer field switch; P, dynamometer field rheostat; Ω, platform scales; R, tachometer; S, radiator; T, thermometer pockets.

with minimum of friction. The frame with field coils in place was then given a rough balancing. A brake arm and stud for counterweight were bolted to the frame diametrically opposite, and suitable pedestals were mounted on a base casting so as to receive the ball bearings and support the generator. The counterweight was adjustable radially on the stud which was threaded.

Most cradle dynamometers that have been called to my attention have had brake arms fitted with weights. This method of measuring the pull has the disadvantage of requiring a number of movable parts or an accurately graduated brake arm. Experience not only in engine testing but in the test of electrical appartus has shown that best results are obtained by the use of accurate platform or spring scales, thus doing away with the graduation of the dynamometer beam. It is, of course, of great importance that the knife edge of the brake beam be an exact number of feet from the centre of the generator shaft, and notches can be cut in the arm at points to give, for example, a length of 2, 3 or 4 feet. Three feet was found to be a convenient length to allow space for the platform scales and passageway for tester. A stop was placed on the magnet frame of the generator to limit its tendency to rotate to a small angle only sufficient to operate scales. This stop is necessary also to prevent reversal of the dynamometer in case the engine should back fire. A bracket was provided on one of the pedestals for a tachometer of the liquid type, which gave good results. A belted mechanical tachometer can be used. but in either case it should be carefully calibrated from time to time to insure accuracy, for it must be understood that the only variable factors in the cradle dynamometer are speed and weight of pull of brake arm. Of course there is always the personal factor of the observer, but this can be corrected by the employment of a checker on work requiring extreme accuracy. If desired, a continuous record of speed and torque can be obtained by an instrument consisting of a clockwork mechanism actuating a long roll of paper graduated in minutes, on which speed and torque curves are traced in ink by pens. The pens are moved synchronously by two pressure gauges connected by small metal tubes filled with liquid. one to the tachometer on the dynamometer shaft, the other to a small cylinder at the end of the brake arm. When the dynamometer is in operation the pressure in the two columns causes the needles to trace the curves accurately, since liquid is practically non-compressible. In studying the operation of an engine with varying load conditions this method is of value, but for ordinary work at uniform load the simple direct readings are preferable.

It is sometimes said that the only error of the cradle dynamometer is the windage of the armature, but this is only I to 2 per cent. of the total output of the generator, and can be entirely eliminated by running the re at the desired speed by means of the gasoline engine and adjusting the counterweight so that the brake arm remains level and the scales read zero.

There are many forms of flexible coupling that may be used between the engine and dynamometer, but there must be real flexibility, otherwise the coupling will cause undue friction by lack of alignment and eventually break. The selection of a good coupling is therefore essential, as was found after breaking a number of strong universal joints and the like. The coupling indicated in the diagram (Fig. 1) was free from objection, and in all our tests has stood up well. It is the old interlaced leather belt type, with which undoubtedly all are familiar. It was found desirable to have the larger outer drum mounted on the generator shaft so as not to unduly load the crank shaft of the engine. By so doing the coupling can be made of comparatively large diameter, facilitating adjustment of leather strap. A locking ring should be provided to hold the belt from slipping out of place and the two drums carefully balanced.

A good way to mount the testing outfit is to use an iron plate divided into squares by T slots near the top surface. The plate should be machined at top, sides and ends, and may be embeded in concrete. It is de-



SIDE VIEW OF DYNAMOMETER.

sirable to mold a groove or channel in the cement around the plate to catch any oil or water. A base of this kind will greatly facilitate the testing of engines of various sizes, and permits of many different combinations and arrangements of apparatus.

A very convenient and effective form of support for the engine is shown in Fig. 1. Four pedestals are machined on top and bottom to correct height to accommodate the supporting arms of the engine so that the crank shaft shall correctly align with the dynamometer. These are clamped or bolted to the table and the engine set in place. It will readily be seen that this method permits of the greatest possible space under and around the engine, and is an improvement on the awkward structures sometimes used.

It is suggested that a test of the engine be made to include one of radiator as well. From personal experience this is of much interest and value. The radiator should be mounted in correct relation to the engine and fan. If it is desired to make the test more complete, both engine and generator can be covered by a bonnet and air supplied by a large blower in front of the radiator to simulate road conditions. By using this method the water can be kept at any desired temperature at inlet and discharge of radiator. In most cases it is preferable to pipe the engine to a water main or large tank. Care must be taken, however, not to have the water too cold, and to prevent this there should be thermometer pockets at the cylinder inlet and discharge.

There are several ways to dispose of the output of the dynamometer. Some makers recommend that it be used for charging storage batteries; it is usual, however, to consider this energy a loss and dissipate it in a cast iron or water rheostat.

Our experience is favorable to the so called "water barrel" with movable electrode, and this is the form shown in Fig. 1 at E. The receptacle for water is not really a barrel, but a cast iron tank with flaring sides so that ice will not crack it in winter. The electrode G is made from a plate of boiler iron, and is suspended by a wire cable. It is desirable to insulate the cable from the electrode as shown. The tank is supported on glass insulators, as the circuit is not grounded. A positive wire from the generator should be connected to the movable electrode, as electrolytic action will after a time cause destruction of the plate, which is more cheaply and easily replaced than the tank. A large cock is placed near the bottom to drain off the electrolyte when desired. Clear water is not a good conductor, and it is found necessary to add a certain amount of Glauber's salt or sodium sulphate (Na2 So4) in order to give the right current capacity. A convenient method is to make a saturated solution of this salt and water in a pail and add as required. This procedure prevents the use of an indefinite amount of salt, and will be found to save much time and annoyance. A rheostat, as shown in Fig. 1, which is about 3 foot square on top can absorb about 25 kilowatts. From time to time it is well to run off the solution and clean out the tank with clear water. A water pipe run to the barrel will save much trouble in filling and cleaning.

In the upper left hand corner of Fig. 1 is a small diagram. The double throw double pole switch N is the same as is seen on the switchboard, and is used for reversing the controller motor H, which raises and lowers the electrode G to regulate load. This is a refinement, and is not absolutely necessary, as G can be raised and lowered simply by the cord. It often happens, however, that the rheostat cannot be located near the test, and it then becomes necessary to find some other means for the purpose. An arrangement to this end has been devised consisting of a small motor, which operates a screw by means of a worm and gear having a ratio of reduction of about 1 to 100. There is a safety device so that when the switch is thrown to lift the electrode, for example, the circuit will be opened automatically before any damage is done. Excellent distant control of rheostat is thus obtained without danger of breaking parts or short circuiting the load line.

It must be understood that the apparatus shown on the switchboard is only for the convenience of the operator, to permit variation of load, to start the engine by using the generator as a motor, and for the protection of the dynamometer itself. In other words, after load is adjusted it is not necessary to have a technical attendant to observe the simple readings which show the brake horse power of the engine.

Having the pull of the 3 foot arm of the dynamometer and the revolutions per minute, the well known Prony brake formula can be applied.

B. H. P. = 
$$\frac{2 \pi L P N}{33000}$$

in which L=the length of brake arm in feet; P=the pull at end of arm in pounds, and N=speed of crank shaft in revolutions per minute. Assuming that the arm is to be 3 feet long the formula becomes

B. H. P. = 
$$\frac{2 \times \pi \times 3 \times P \times N}{33000}$$

and combining constants.

B. H. P. =  $0.00057 \times P \times N$ , which is a simple and sufficiently correct formula for ordinary purposes.

Voltages of 115 and 230 direct current have recently been adopted as standard for shop power circuits, and the switchboard equipment can be adapted to either.

In order to be able to start the gasoline engine by dynamometer, the starting box J (Fig. 1) and double pole double throw switch I are wired into the power circuit. If hand cranking is to be used both starting box and switch can be omitted, much simplifying the board. In either event there should be an adjustable overload circuit breaker K to prevent injury to the engine in case of short circuit on the load line.

Again, if some part of the engine "seized," preventing it from starting when using the dynamometer as a motor, the circuit breaker would operate and a burnout would be avoided.

The voltmeter M and the ammeter L are not essential, but are strongly recommended as indicative of conditions in power and load circuits.

The switch N has already been referred to in description of the method for controlling movable electrode. To vary load it is only necessary to momentarily throw reversing switch N up or down to raise or lower electrode G. If hand control of electrode is preferred, motor H and switch N can be eliminated. They will, however, be found of great convenience.

It will readily be seen that the switch O is in the power circuit of the dynamometer field and should be provided with fuses. The rheostats P, P afford regulation of field strength, and for fine gradation of load one should have about ten times the ohmic resistance of the other, with, perhaps, 25 points on each.

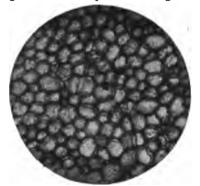
In preparing this description of apparatus for the test of gasoline engines it has been the aim of the writer to set forth somewhat in detail such arrangements as have been

found, by actual experience, to be useful in studying and improving engines, more particularly with relation to the automobile. Those members who already employ the cradle dynamometer method will undoubtedly be able to add much of value to what has been said, and it is hoped that there will be liberal discussion of the subject, which will bring out further points of interest and assistance to the membership in general.

# The Production and Properties of Cork.

The following matter is taken from an interesting pamphlet issued by the Armstrong Cork Company, of Pittsburg, which we received through the kindness of Wheeler & Schebler, who use this material for their carburetor floats. Owing to its rather extensive use for this purpose, and in friction clutches, we believe it to be of some general interest to the trade.

Most of the world's supply of "corkwood" is produced in the countries bordering the Mediterranean Sea. Portugal and Spain are the largest producers, although considerable quantities are grown in



CORK UNDER THE MICROSCOPE.

Algeria, southern France, Tunis, Italy, Sardinia and Sicily. The "corkwood" of commerce is produced from the bark of a species of oak which grows to a height of from 20 to 60 feet, and sometimes attains a diameter of 4 feet. Only the outer bark is used, it being removed very carefully so as not to kill the tree. The first bark is harvested when the tree is about twenty years old, and is of inferior quality and of little commercial value. Some ten years later the tree is stripped again. While the second stripping gives better bark than the first, it is not as good as that furnished by the later strippings, which occur at intervals of about nine years. The best bark is produced after the tree is about forty years old, and it usually continues productive until nearly a hundred years of age, though much older trees are not unknown.

Both the trunk and the larger branches are stripped. The bark ranges from half an inch to 2½ inches in thickness, and a tree may yield 45 to 500 pounds, depending upon its size and age.

As the bark is removed it is gathered in piles and left a few days to dry. Having been weighed, it is carried to the boiling stations, where it is stacked and left to

season for several weeks. The boiling process loosens the woody outer portion of the bark, so that it can be scraped off. It also removes the tannic acid, increases the volume and elasticity of the bark, makes it soft and pliable, and flattens it out for convenient packing.

After being roughly sorted as to quality and thickness, the bark is transported overland on burros, much of it going to Seville, which is the greatest centre of the industry. Here it is sorted into a dozen or more grades, according to quality and thickness. That destined for transportation is packed in bales, which have the grade stencilled on the side.

When these bales are received the corkwood is sorted into some twenty-five grades, which are finally divided into about 150 classes, according to quality and thickness. This sorting is the most particular process in the manufacture of articles from cork, since the success of many articles depends upon the uniformity of the material. After sorting the corkwood is placed in a warm vapor bath to soften it before cutting.

The cutting processes vary considerably with the shape of the article being produced, but they all depend upon the use of a thin knife, kept sharp as a razor, which revolves rapidly while being pressed against the cork. This gives a drawing cut, the microscopic teeth on the edge acting like a saw.

Under the microscope cork shows a most peculiar structure. It is seen to be composed of small sealed air cells, which lie together like roughly round pebbles in a pile. These give it its unusual toughness and resistance to wear; they make it nearly impervious to air, water, oil and similar substances, a non-conductor of heat and a non-absorbent of moisture.

It is used for a great variety of purposes, and the industry is of considerable size, as will be seen from the fact that the annual imports into the United States of crude and manufactured cork reach a value of almost \$5,000,000.

At Frankfort, Germany, about 80,000 square metres of road surface is being tarred this summer in order to combat the dust nuisance.

According to a German consular report there is not much of a market for motorcycles in Chili, as the roads leave much to be desired. The imports of motorcycles during the past year amounted in value to \$59,640, and were mostly of American and German origin. The use of automobiles is limited, owing to the bad roads, the difficulties of getting repairs made, and the unreliability of the drivers obtainable. Owing to the financial crisis the value of imports decreased from \$79,691 in 1907 to \$38,515 in 1908. The principal countries of origin are the United States, France. Germany and England.

# Five Glass Landau Auto Body Design.

By Joseph Ledwinka.

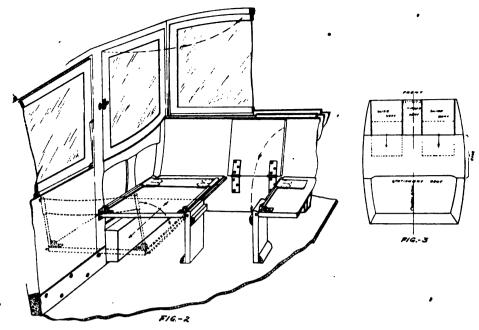
Fig. 1 represents a novel design for a body in which the position of the front seats is optional with the passenger. The outward appearance is similar to that of a standard carriage of stylish and conservative lines. The body is ample in size, and makes a very comfortable vehicle for taxi service.

The pressed steel frame is dropped between the wheels to bring the body lower and make access very easy. The wheels in this particular design are 36 inches, but these, as well as the frame, can be changed within considerable limits.

Both the size and the location of wheels in Fig. 1 are very pleasing to the eye, and in this respect the design appears to be well proportioned. The rear spring construction is much used in carriage building, and is a well tried, practical and flexible arrangement. The front springs are placed as usual in automobile construction.

The front side windows are hinged on specially constructed hinges, which permit the window to be opened inward, folded against the front window and slid down in a casing or pocket within about 12 to 14 inches from the floor. The front window slides down also, as usual in these windows. So do the door windows, leaving the body open all around the front seat. If the rear leather top is folded down the whole upper portion of the body is open, leaving only the front canopy on the four stationary posts.

Coming to the seats we find a very novel arrangement. The perspective view, Fig. 2, shows the arrangement. The front seat is divided into three parts, of which the centre part is about 12 inches wide, and is hinged with strap hinges to the back of the front seat. The two side seats are set into slides, permitting same to be slid



toward the middle of the doors. On the upper side of these sliding seats are hinged back rests, which can be turned up and form a comfortable back.

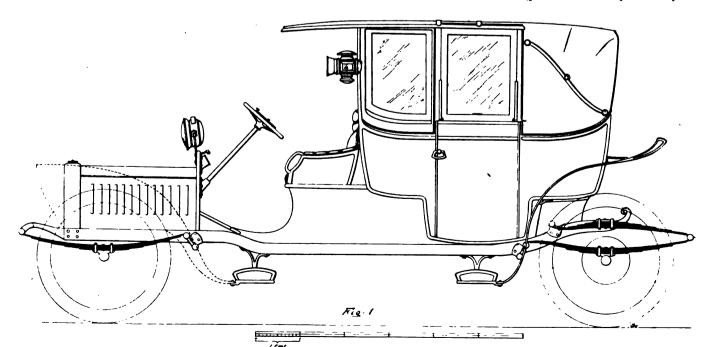
In sliding these seats toward the doors foot room is created in front of them, and the passenger can sit very comfortably, facing the direction of the car. The foot room extends underneath the window casing or pocket, giving ample room. Should the passengers desire to face each other the two slide seats may be pushed forward, the hinged back rest folded down, and the small centre seat folded down, which will give a solid seat all the way across. The middle or hinged seat is upholstered on both sides to match the surrounding upholstery. The two side seats are provided with two loose cushions.

This arrangement is inexpensive to build, and would be very much appreciated by the public.

Fig. 3 shows another view of the seat arrangement. The dotted lines show the position of the seats when facing in the direction of the car.

# New Cushion Tire to Be Manufactured in Columbus, Ohio.

The Cleveland Puncture Proof Tire Company, recently incorporated by Columbus, Ohio, men with a capital of \$20,000, has opened an office at 1355 North High street. The concern holds patents on a tire, the invention of an Akron rubber expert, which is claimed to be better than the ordinary pneumatic tire. At present they are manufactured at Akron, but it is expected to start a plant in Columbus. Robert S. Knepper is president of the concern. The tire is of solid rubber with an air hole of about an inch diameter in the centre, with a slit extending toward the rim, which it is claimed gives the necessary resiliency.



# NEW VEHICLES AND PARTS ➤ ➤



# Maxwell Four Cylinder, Thirty Horse Power 1910 Cars.

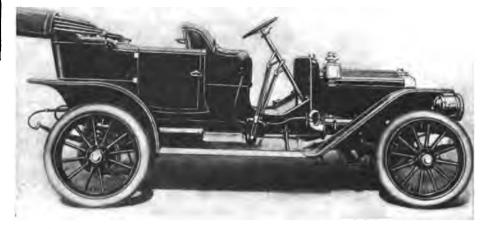
The new four cylinder, 30 horse power models of the Maxwell line for 1910 follow in most particulars the construction of the same cars a year ago, although a number of important modifications and refinements have been made in their design. The most obvious changes are a longer wheel base, larger wheels, roomier bodies and a marked improvement in riding qualities attained by the use of three-quarter elliptic springs. The frame is of pressed steel, hot riveted, and of channel section.

The power plant is of the four cylinder, vertical type, with cylinders cast separately, so that five large bearings can be used. Easy access to connecting rods, main bearings, etc., is insured by large hand holes, four on each side. The valve chambers and water jackets are integral with the cylinders. The water spaces are very large, and extend not only around the piston chamber but also around the valve chambers. The valves themselves are of generous size, located on opposite sides, and operated by cams and square push rods moving in bronze guides.

The crank case forms a unit with the transmission case, and is a special aluminum alloy castings, divided into four compartments which hold a quantity of oil for lubricating the main bearings and connecting rod bearings by splash. The crank shaft is drop forged of nickel steel, finished all over, and treated by a special toughening process. The main bearings are of specially compressed babbitt metal. Particular attention has been given to the connecting rods and their bearings. The rods were especially designed to allow adjustment at both ends, and have oil grooves to insure perfect lubrication.

No change has been made in the change gear, which, as in former cars, is of the progressive sliding gear type, with three forward speeds and reverse. A noteworthy feature of all Maxwell cars is the provision of an interlocking device, consisting of a notched quadrant, which makes it impossible for the operator to shift gears while the clutch is in engagement. The high speed drive is direct from the engine shaft, without intervening gears. The gears are made of chrome-nickel steel of ample proportions. The motor and change gear are supported on the frame at three points. This three point suspension has been a Maxwell feature since 1903. The advantage of the unit construction of power plant and transmission housing lies in the fact that the distortions to which the frame is unavoidably subjected leave the engine bearings and transmission bearings in perfect alignment.

The clutch is of the well known Max-



MAXWELL MODEL E, FOUR CYLINDER, THIRTY HORSE POWER TOURING CAR.

well multiple disc type, and the saw steel discs revolve in a compartment filled with oil. This arrangement reduces wear to an almost negligible quantity, it is claimed. The oil in the clutch compartment is said to also perform the peculiar function of facilitating the action of the clutch in engagement, and this is explained in the following manner: While the oil lubricates the clutch with the plates sliding loosely upon one another, the cohesive property of the thin film of oil that remains between the plates after the surplus has been squeezed out causes the clutch plates to be locked firmly and to rotate together without slipping when the clutch is engaged. Yet the clutch can be made to slip to any desired degree without heating, it is claimed.

The drive to the wheels is by propeller shaft, with two universal joints. The forward universal joint is packed in grease while the one at the rear end of the shafts is provided with a unique self oiling device which is claimed to obviate all wear. The engine is inclined so that a straight line may be drawn through the engine shaft and continued through the transmission and drive shafts through the differential. This straight line drive reduces wear in the universal joints to a minimum besides saving engine power.

Cooling is by the thermo-siphon system, of which the Maxwell was an early exponent. This method of engine cooling requires no pump. The cooling effect is proprotionate to the requirements of the engine. The action of the honeycomb radiator is assisted by a belt driven fan.

The carburetor is of Maxwell design, of the constant level, float feed type, and provided with means for automatic compensation.

The engine is lubricated by means of a pump designed by J. D. Maxwell. This pump forces the oil in exact quantities through a single sight feed into each cylinder. The lubricator is driven by a double set of gears and is positive in its action. Rather novel is the manner in which efficient lubrication of the pistons is insured. The cylinder bears at its base a grooved

ring, which is kept filled with oil at all times and into which the piston dips at the end of each downward stroke. The piston itself is provided with two grooves. The lower groove is filled with lubricant every time the piston dips into the oil ring on the downward stroke and carries oil in an even film all over the cylinder wall. The overflow from the oil rings goes into the crank case and there augments splash lubrication.

Ignition is by magneto with non-vibrating coil, a battery of dry cells being added to facilitate starting. The coil is carried in a steel cylinder under the floor board so that the dash is unencumbered with accessories, and shows only the two-way switch, a single sight feed and glass gauge indicating the level of the lubricant in the tank, which latter also is carried under the hood.

Gas control is double, by pedal and by lever located at the left immediately under the steering wheel. Spark control is by a similar lever under the wheel, located on the right side. The steering wheel is large, and the steering itself is accomplished by worm and sector.

The rear axle is of substantial construction, and equipped with four roller bearings, two on either side of the differential and two near the hubs. The drive pinion also is equipped with two improved roller bearings. Two sets of brakes of the external contracting and internal expanding type are mounted on the rear hubs.

The wheel base has been lengthed to 110 inches, which is still quite reasonable.

The wheels are of artillery pattern, of selected second growth hickory. Their diameter is 34 inches, and the rims are of the quick detachable pattern, with 4 inch tires in front and rear.

All Maxwell bodies are made of sheet steel with stamped moldings, a construction as light as wood and stronger than aluminum, not liable to breakage, since dents may be hammered out, while in the case of the broken wood body the substitution of an entire new panel becomes necessary. The 30 horse power Maxwell chassis is furnished with three styles of body, viz., the Model E, five passenger

and change them fully as frequently as is advisable.

Perhaps the growth of the business around Boston is largely due to the activity of the agents for one make of truck, who have seen the possibilities of the business and have had the courage of their convictions. This concern formerly was and still is in the manufacture of carriages and wagons, and its members enjoy a wide acquaintance among the express companies in the vicinity. They were able to see what

was wanted, and when the machine came along that they thought was right for their customers they did not hesitate to secure the agency for it and recommend it. Then, after having sold the truck they placed themselves in such a position as to keep their customers satisfied, doing repairs and furnishing replacements promptly, and making moderate charges. The result has been that this firm has almost a monopoly of this line of business in the vicinity of Boston.

# Self Regulating Dynamos for Auto Lighting and Ignition.

BY ALBERT L. CLOUGH.

Now that electric lights have come to be so largely used upon motor cars, there is a decided tendency toward the installation of small direct current dynamos for the purpose of continuously recharging the accumulators required to feed the lamps and sometimes frequently to operate the ignition system as well. A generator delivering a nearly constant voltage, independent of the very wide speed fluctuations of the gasoline motor which drives it, is necessarily required. The centrifugally actuated flyball governor, controlling a friction clutch pulley? has been largely used to maintain the generator speed constant, despite the fluctuations of speed of the car motor, and there has also been slightly used an automatic field rheostat, so arranged as to weaken the generator field current in proportion to the increase of speed and vice versa. In order to accomplish this a centrifugal governor is so arranged as to cut into or out of the field circuit a series of resistances when the speed rises or falls. When this arrangement is correctly proportioned the increase in voltage which would be occasioned by a certain increase of speed may be very nearly counterbalanced by the decrease in voltage occasioned by the weakening of the field, which is brought about by the resistance automatically added to the field circuit by the centrifugal governor's movement, due to the rise of speed, and the e. m. f. delivered is thus kept reasonably constant.

It is not unlikely, however, that automatic mechanical devices, such as these, which involve moving and wearing parts and a certain degree of complication, may ultimately be superseded by regulating tendencies inherent in the generators themselves, and due to special features of design.

Inherent regulation of a direct current generator may be favored to a considerable extent by a proper proportioning of copper and iron in armature and field, and by properly predetermining the degree of saturation of the iron, but in the production of a constant voltage, variable speed generator, advantage is sometimes taken of the phenomena of armature reaction. This is done in the case of one small shunt wound bipolar machine designed for vehicle lighting. The neiple involved is crudely illustrated in

e accompanying diagram, Fig. 1.

AUXILIARY BRUSHES.

Two sets of brushes are used, of which ab is the main pair. These bear upon the commutator in the usual position for nearly sparkless operation, that is, at or near the neutral points. Brushes cd are an auxiliary pair which touch the commutator on a diameter nearly at right angles to the main brushes. They are, however, not exactly upon this diameter, but are displaced appreciably in the direction of rotation of the

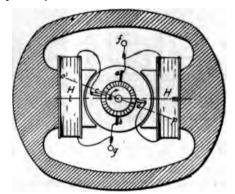


FIG. 1.—INHERENT DYNAMO REGULATION OF VARIED SPEED.

armature. The shunt field circuit is as follows: From one of the main brush leads, near f, it goes through one of the field spools H, and thence to auxiliary brush d, through the armature windings to the other auxiliary brush c, thence through the other field spool H, and finally connects to the other main brush lead near the service binding post g. The auxiliary brushes thus bridge between the two field spools. If c and d were set exactly upon a line at right angles to the line joining the neutral points, at or near which the usual brushes of a bipolar machine are set, there would be no effective voltage acting between them, for the voltage generated in the upper half of the armature would exactly counterbalance that generated in the lower half. If the auxiliary brushes are placed on one side of this perpendicular to the neutral axis, a voltage in a certain direction acts between them, the amount of which depends upon the angle of displacement, and if these brushes are set upon the opposite side of this line the voltage between them acts in the other direction.

The armature and field of this machine are so proportioned that there is a very strong armature reaction; that is, as the current builds up in the armature the magnetic field, which it produces as it circulates in the armature conductors, tends very strongly to shift the field due to the field magnets, with the result that the neutral axis tends to rotate in the direction of rotation of the armature.

PRINCIPLE OF REGULATION.

At very low speeds, when the tendency is for the armature current to be low, the auxiliary brushes have a lead in advance of the line perpendicular to the neutral axes lm, and a certain voltage acts between them. The connections of the auxiliary brushes to the field circuit are so poled as to cause this voltage to act in the same direction as the main field exciting voltage, and thus to assist in energizing the fields. The result is that when the armature is turning at very low speed the field excitation is very much greater than it would be if the auxiliary brushes were not used, and the voltage very much nearer the desired value.

As the armature speeds up there is a tendency for its current to increase, and increased armature reaction results. At a certain point of speed increase, the line 1 m has rotated until it passes through the brushes cd. Under these conditions no voltage is acting between c and d, and they have no effect upon the excitation, the generator operating on simple shunt excitation. As the speed is still further augmented, and the armature current tends to increase to a higher value, the neutral axis is still further rotated and line lm assumes a position such as op. Now there is again an effective voltage between brushes c and d, but, as previously indicated, it is in the opposite direction from previously, and now tends to oppose the regular shunt excitation. Despite the high speed, the reduction in field strength is sufficient to hold down the working voltage to a very much lower value than it would have if the auxiliary excitation were not provided. The higher the speed the greater the shifting of line op in the direction of rotation, the greater the opposing voltage between c and d, and the greater the weakening of the effective field. By a proper setting of the lead of brushes c and d the regulating effect can be increased or decreased, and quite wide variations in speed can be very nearly overcome.

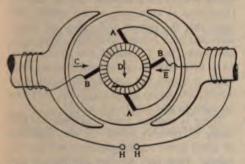
If the evil effects of sparking at the main brushes can be minimized, this arrangement should be of value, as it effects regulation without moving parts, and can always be depended upon so far as it goes.

ANOTHER METHOD OF REGULATION.

Another method of regulation, which has been evolved to secure a constant current through a constant resistance, at widely variable speeds, will here be described, in principle (Fig. 2). This also depends upon armature reaction. To secure the desired results an armature of large iron content and rather heavily wound is used, and the field magnets are of quite small iron section, but

heavily wound with series coils so that they are saturated readily. The pole pieces, on the contrary, are massive and embrace a large polar arc. The brushes AA, which are set as are the main brushes of an ordinary bipolar generator, are here the auxiliary brushes, and are connected together, thus short circuiting through them the armature winding. Brushes BB, which are set on a diameter nearly at right angles to brushes AA, become in this generator the service brushes, and furnish the working current to binding posts HH, through the series fields.

The condition of the magnetic circuit is somewhat more involved than in an ordinary generator. The field coils set up a flux in the ordinary direction from pole piece to pole piece in the direction denoted by the arrow C. This is cut by the armature conductors, which are short circuited by the brushes A A, and currents circulate in the two halves of the armature winding exactly as they do in the armature of an ordinary generator, and produce a cross magnetic flux corresponding to the cross magnetization due to ordinary armature reaction. As the volume of the short circuited current is large, and as the pole pieces are



INHERENT REGULATION FOR VARIABLE SPEED.

very susceptible to it, the cross magnetic flux in the direction of arrow D becomes a very important factor compared with what it is in a machine of usual construction.

The armature conductors in their rotation cut this cross flux D, and a current is induced in them, which is taken off by the working brushes BB to the fields and the external circuit. This current, flowing through the upper and lower halves of the winding, tends also to magnetize the armature core and the pole pieces, and the direction of this flux is along arrow E. That is, this field, which is produced by the armature reaction of the working current, directly opposes the field due to the field magnets. This brings about a very unstable condition of the effective field, which gives rise to the working current. Remembering that the field magnets are of very small cross section, and heavily wound, it is plain that they reach nearly their full saturation before the normal output is attained. The pole pieces and armature core being massive, these parts are at a low density, and an increase of current in the field coils has little influence upon them. Changes of current in the armature acts, however, very powerfully upon these parts at their relatively low degree of saturation.

If the machine is working normally and is suddenly speeded up, the cross field due to the currents short circuited by brushes A A increases, and there is a tendency for the armature conductors cutting this field and furnishing current to the working circuit to increase. Upon such a slight increase occurring, its armature reaction along arrow E instantly increases, and the resulting flux tends to counteract and reduce the field magnet flux C, which latter, being diminished, causes a diminution in flux D, and a lessening of the current produced by it in the working circuit. The rise of current in the working circuit is thus limited to a very small value,

A diminution in speed produces actions opposite to those above described,

On account of the small mass of iron in the fields and the large number of field turns, the machine "builds up" to a working condition at quite low speeds.

By shunting a portion of the working current away from the field coils, regulation to varying current strengths can be attained.

# Methods of Providing Against Torque Reaction.

BY F. E. WATTS.

In all shaft driven cars there is a tendency, when starting forward from rest, for the rear axle housing and propeller shaft to turn backward. When the hub brakes are applied while the car is moving their reaction tends to turn the axle casing forward. These "torque reactions," as they are commonly called, must be resisted by some member or members fastened to the axle in a sufficiently rigid manner to prevent it from turning out of its usual position more than a limited amount.

Three methods of taking this torque reaction are at present in vogue. Where only one universal joint is used the propeller shaft is commonly enclosed in a tube, and this tube takes the torque. The forward end of the tube is usually fitted with some kind of a universal joint arrangement which secures it to the frame. Thus the torque is transmitted from the rear axle directly to the frame. When the brakes are suddenly applied or the clutch is thrown in abruptly the torque reaction rises to its highest value. It is then imperative that the torsion member be very strong or have some provision for yielding slightly under an excessive stress. In the construction just described the tube must be made strong enough so that it is too rigid to yield any perceptible amount. The only way in which deflection can take place therefore is by compression of the springs in the case of brake application, and by the lifting of the car and passenger weight when the clutch is thrown in.

SPRINGS AS TORQUE MEMBERS.

This method of taking torque reaction is quite generally used in the smaller cars, but when the motor is much over 30 horse power the stresses become so great that most designers prefer to adopt some other construction. In quite a few of the smaller cars the torque tube ends just at the rear of the universal joint, and a ball or roller bearing is placed at this point. The torque reaction is then carried by the universal joint. While this construction would seem to be more faulty than the last, from a theoretical standpoint at least it appears to give good service in practice.

For the more powerful class of machines two universal joints are commonly used. The joints are ordinarily enclosed, but the connecting shaft is left bare. A separate torsion member is provided. This has quite commonly consisted of a tube with a ball joint at its forward end, the socket for this ball being secured to a cross member of the frame. The socket is commonly carried in a tubular case between helical springs, so that no matter in which direction the stress comes one of these springs deflects and prevents excessive stresses in the torsion member and transmission parts.

PRESSED STEEL TORSION MEMBERS.

The present tendency is to use torsion members of pressed steel rather than tubular ones. They are usually made of narrow channel section with lattice web, very deep at the rear end and tapering to the end which joins the frame. Sometimes the torsion member is made from two tubes with their rear ends attached to the top and bottom of the driving gear housing respectively, and their front ends joined so that they form a V. Either of these last two constructions gives a light and strong torsion member, but their front ends must be spring supported, as when a single tube is used.

The third method of taking torque reaction is the simplest, and may be the best for certain classes of cars. It consists in making the springs fast to the axle and also to the frame, and letting them take care of the torque reaction as well as the spring support. The propeller shaft is, of course, fitted with two universal joints. Where this is done there must be a very perceptible deflection of the springs when the brake or the clutch is suddenly applied, and this deflection must greatly reduce the maximum stresses in the transmission parts,

While this construction has been used by only a few makers in this country and abroad, they are representative concerns whose practice it is well to watch. It is being used with apparent success on some very powerful cars, and it would seem to permit of a lighter car for a given maximum stress in the transmitting parts than any other construction. It will be interesting to observe whether the circle of adherents of this construction increases.

We would be glad to have any of our readers give their experiences as to the relative amount of wear in the universal joints with different types of construction.

The seventh annual automobile show in Turin, Italy, is to be held April 3 to 24, 1910. The show will again be held in the Valentino Park, and will comprise a motoragricultural and an aerial section.



# Annual Depreciation of Cars.

Editor Horseless Age:

I was much interested in taking up The Horseless Age of September 1 to see that it contained an article by Mr. Clough on the "Economics of Motoring," a subject in which automobile owners are vitally interested. Occasionally some outdoor life magazine has published a carelessly thought out article on the cost of motoring, but to date I have seen little in our papers about the cost of motoring that was not misleading.

I always look forward to reading Mr. Clough's thoughtful articles, but this time I was somewhat disappointed, as he does not base his findings on real experiences (and he must have a great fund of that sort of information), but rather on the empirical assumption that the all important item of depreciation in using a car can be based on an accurately determined seasonal depreciation in the selling value of the car. That would today be a misleading assumption for us all—the manufacturer, the owner and the dealer-though there are, of course, some dealers who have agreed on a fixed exchange value which they will allow for cars of a certain vintage when exchanged for newer ones.

The manufacturer of cars would, I am sure, no longer agree with Mr. Clough that "the decrease in value of the car or depreciation \* \* \* is mainly a matter of elapsed time alone, but which is somewhat dependent upon the extent and manner of use of car," for the great stress laid in all automobile advertisements on wearing qualities shows what the public wants and what the manufacturer claims to give.

The automobile owner, now that the annual improvement in each succeeding model is slight, expects to use the same car for several seasons. He is in consequence less interested in the exchange value of his car with the dealer at the end of one season. but he does want to know how much he has reduced the total possible mileage of the car by the season's running. We used to look at the teeth of a horse to find out how many years of life were left; we look at the teeth in an automobile to see how many miles it will still run. The question of mileage life is the all important one to the owner, whether he runs an imported limousine, a taxicab or a motor truck.

Why doesn't the automobile community come out and face the question of costs squarely? In the end it would be beneficial to all concerned, as it would teach the value of lasting qualities, of good workmanship, of careful use, of economical buying of supplies. Any figures based on experience could only be approximate, but "bey would be helpful. What I am appeal-

ing for, from Mr. Clough's able pen, is an article showing what we common, everyday car owners can expect of a car when in ordinary use by the average user. It is the duty of a technical paper like yours to tell us that a touring car in an economy test can go 42 miles on a gallon of gasoline, but what is much more to the point in my case is that the sort of driving that I, and my chauffeur, and my friends who have similar cars, do, produces about 11 miles to a gallon. I know that it costs me three-quarters of a cent a mile for grease, oil, etc., and that my tires, though they vary greatly as individuals, average consistently above 4.300 miles, but I do not know what my machinery and running gear is costing me per mile, and yet that is the most important and largest item in the operating column. You see I know perfectly well what my fixed charges are, but I have not the necessary information on operating charges that would enable me to decide a simple question of everyday occurrence like the following: Which is the most economical way for me to get my mail twice a day from the post office 3 miles away: send my chauffeur in the imported touring 'car; go myself for it in my American \$4,000 runabout, or pay a youth \$30 a month to ride it up on a bicycle?

Now, Mr. Editor, please let us hear from the manufacturer and from the owner about the life of their cars, expressed not in terms of Glidden Tour trophies, and sealed bonnet contests, or chauffeurs' prizes for minimum first year repairs, but told in words of one syllable for the simple and trusting "average" driver.

A READER.

# Professional Chauffeurs' Badges. Editor Horseless Age:

As a regular reader may I ask you to favor me with the following information:

How many States furnish and compel the wearing of badges by professional chauffeurs, and which States are they? Do you personally think it a necessity?

ARTHUR CUNDY.

[Badges are at present being required to be worn by professional chauffeurs in twelve States, viz., California, Illinois, Michigan, Maryland, Massachusetts, Missouri, Minnesota, New York, Ohio, Pennsylvania, Utah and Vermont.

The requirement undoubtedly acts to protect the State and also licensed chauffeurs.

—Ep.1

## A Case of Missing.

Editor Horseless Age:

I have a car with a four cylinder engine, with make and break ignition and a double jet carburetor. The small jet is controlled by the throttle lever on the steering wheel. The nozzle has a fixed opening, and the mixture is varied by means of a revolving sleeve which uncovers a series of holes bored in the base. The large jet also has a fixed opening, and is similar to the small one, except that it has an auxiliary air valve.

Using the small jet the engine misses badly. I am even unable to adjust the carburetor so the engine will not miss with the car standing on the floor. It not only misses but with some throttle openings runs on three cylinders. I am unable to detect whether this is due to cutting out of any particular cylinders, because each cylinder runs beautifully alone. Any two will also run without skipping, but when the four are put in the engine misses again.

I have owned three cars of the same make as this, and practically the same engine, and all have run fine, so it cannot be the design of the engine or the carburetor. A peculiar thing is that the adjustment of the sleeve seems to make very little difference in the running of the engine, though the engine seems to run better with the leanest mixtures I can give it. Previous engines would vary greatly in speed, and even quit when this sleeve was moved even slightly.

On the road when the slightest grade is encountered, or when the engine is working while picking up on the high gear, all four cylinders explode all right; but when a slight down grade is encountered, say 1 or 2 per cent., the car seems to overrun the engine, and the latter generally runs on two cylinders. The timing of the ignition and the valves is perfect. The compression is good, and there are no leaks in the inlet pipes. The float mechanism seems to be O. K., because the car runs all right on the big jet.

Missing.

[You do not say whether the engine worked as described right from the time it was delivered by the factory or whether the faulty action developed later. If the motor originally ran well on the small nozzle it is, of course, a sign that some of the adjustments have been disturbed, or that there is an obstruction or a leak somewhere in the fuel system. If the motor always ran faultily it may be concluded that the nozzle is not of the proper size to give a correct mixture. The two nozzles with their surrounding spray chambers usually constitute separate carburetors. The small nozzle works (alone) only when the engine is throttled, in which case there is particular chance for the mixture to be disturbed by air leakage. We would advise you to look carefully for air leaks between the carburetor and the motor. Also whether it is not possible for the supplementary air valve to open and admit some air when the small nozzle is working. This might be rendered possible by a poorly fitting valve, for instance.

The small carburetor, of course, furnishes either too lean or too rich a mixture, and it would be well to find out first of all which of the two it is. You say that you get the best results when you adjust the carburetor for lean mixture, which would indicate that usually it is too rich. This conclusion is borne out by your further statement that the engine will work regularly when pulling fairly hard, but will miss when running without load, as in such

a case it would speed up and the richness of the mixture would tend to increase. If the mixture is actually too rich the exhaust should contain black smoke. A lean mixture is characterized by a tendency to tackfire in the carburetor.

If the mixture is found to be too rich this may be due to too high a level in the float chamber, owing to puncturing of the float or leakage of the float valve, too large a size of nozzle, or partial obstruction of the air mlet below the nozzle, tending to increase the suction on the nozzle.—Ep.]

# Starting Six Cylinder Motors.

Lditor Horseless Age:

Your discussion of the subject of starting six cylinder motors on compressed air has started me thinking, and I offer the following suggestions on the subject:

It would be possible to start on compressed air in the manner mentioned if the pressure of the compressed air were high enough to not only overcome the work necessary to compress the gas in the cylinders, but in addition to store enough energy in the flywheel to run the engine idle for a few revolutions, to allow the engine to get its regular working mixture in the cylinders after compressed air had been shut off

A better way would be to supply a mixture of gasoline vapor and air in compressed form to drive the motor. If the mixture were of correct proportions the explosions would take place as soon as the engine had made one revolution. The carburetor passage could then be opened, and the engine would run normally.

A gate valve might be used in the carburetor passage, thereby dispensing with the disadvantages of a check valve.

On account of the complication and space taken up by tank, pump, etc., I do not think it would be good practice for automobile work. It might, however, be used for large stationary or marine motors.

F. CHARAVAY.

The exhibition of speed indicators in Berne, which was organized at the instance of the Swiss Department of the Interior, with the object of securing a useful model for compulsory introduction on all automobiles driven in Switzerland, is being participated in by twenty-one manufacturers. The committee of experts appointed by the Government at its first meeting rejected thirteen models as unsuitable. The other eight were retained, and will be tested in practical use on automobiles. The trials will begin toward the end of this month.

An automobile line is soon to be established between Carlsbad and Monument, N. M. A road is now being built, and as soon as it is completed a number of 60 horse power cars will be placed in service. Several months ago a service was established between Carlsbad, Knowles, Seminole and Midland, N. M.

# Indianapolis to Produce 20,000 Cars Next Year.

It is reported that all Indianapolis manufacturers expect to increase their 1910 output over this year's production. A conservative estimate has it that 20,000 cars will be manufactured in that city next season, one company planning to build 6,000 cars, while another company will manufacture 5,000 cars.

Practically all of the manufacturers have decided to adopt one or two styles of chassis upon which a variety of bodies will be offered; those who have been making four cylinder cars to limit themselves to one four cylinder chassis, and those who have been making both four and six cylinder chassis, to make one chassis of each type. However, one company will make a four cylinder and two six cylinder chassis types.

The Indianapolis agencies state that the sales so far this year have exceeded those of all of last year. One company has sold 750 cars this season, while all of the others have disposed of their original 1909 allotments. Between January 1 and September 10 there were 4,887 automobiles and motorcycles registered with the Indiana Secretary of State.

# May Withdraw from Ohio A. A.

A movement is on foot among the members of the Columbus (Ohio) A. C. to withdraw from the Ohio Automobile Association and ally itself with the Automobile Club of America. The movement started with the refusal of the State organization to participate in the expenses caused by the litigation to have the municipal licensing of motor cars in Ohio declared unconstitutional. Since the decision reached after expensive litigation was beneficial to every autoist in the State, it was thought the State association should help to stand the expenses. A meeting will be called soon to take action on the matter.

## St. Louis Dealers Elect Officers.

The St. Louis Automobile Dealers' and Manufacturers' Association held its first meeting since its recent incorporation at the Glen Echo on August 31. The constitution and bylaws, drawn up by a committee, were adopted, and the following officers were elected: H. B. Kenning, president; Chas. E. Michel, vice president; Sam Breadon, treasurer, and Robert E. Lee, secretary. Mr. Kenning is president of the Dorris Motor Car Company; Mr. Michel is connected with the Union Electric Light and Power Company, and Mr. Breadon with the Western Automobile Company. Messrs. Breadon and Lee were re-elected, having held their respective positions since the association was founded. After the adjournment of the general meeting the board of directors held a special meeting to consider ways and means for securing fairer automobile regulations for St. Louis. Secretary Lee was

instructed to secure copies of the automobile ordinances in force in other large cities of the country, and it was decided to invite Mayor Kreismann to a meeting to be held in the near future, at which the question of regulations is to be discussed. The meeting was well attended.

#### The Lowell Stock Chassis Race.

The final event of the Mergimac Valley automobile carnival took place on Wednesday of last week, and consisted of a race for the heaviest class of stock cars over a distance of 318 miles over the Lowell circuit. The race was won by George Robertson, driving a Simplex car, in 5:52:01 2-5. Second place was secured by A. J. Poole, driving an Isotta-Fraschini, in 6:13:37 1-5, and third place by E. H. Parker, driving a Fiat, in 6:22:21 2-5. The course was guarded by soldiers, and no serious accidents occurred. This being the chief event of the week, and the weather being fine, an enormous crowd turned out to see the race.

## Indianapolis to Have a City Garage.

William A. Rhodes, chairman of the finance committee of the Indianapolis City Council, has recommended that the city establish a municipal garage for the cars that are used by the various city departments. At the present time the city has eleven automobiles in service, and is spending about \$5,000 a year for their maintenance. New cars are to be purchased soon for the use of the city dairy inspectors, and also for the city license inspector. Mr. Rhodes believes that if the city had its own garage, with its own mechanics, it would save money, and at the same time get more satisfactory service.

# Farmers' Insurance Companies to Enter Auto Field.

Farmers' mutual insurance companies of Indiana are taking up the question of insuring automobiles and gasoline engines, and some opposition is resulting among the stockholders of certain companies. One of the leading companies of the kind, the Farmers' Mutual Insurance Company of Montgomery and Fountain counties, has the question under discussion, and probably will decide to insure the automobiles of its members.

## French Exports.

The French exports of automobiles during the first six months of the current year aggregated in value 73,607,000 francs, an increase of 6,842,000 francs over the figure for the same period last year, but a decline of about 4,000,000 francs as compared with the same period in 1907. The imports of foreign automobiles into France again show a slight decline. The aggregate value for the six months was 3,752,000 francs, as compared with 3,774,000 and 4,530,000 francs during the corresponding periods of 1908 and 1907 respectively.

# Commercial Applications.



# Taxicabs in Baltimore. By L. M. WARFIELD.

Baltimore, with rough streets and plenty of hills, is one of the hardest cities of the country on taxicabs. That they have been made to pay, and that the company is encouraged by its success in educating residents to use the service is greatly to the credit of those who inaugurated the service in the city.

Perhaps the worst obstacle was the fact that Baltimore has never had a real cab service. Even the Pennsylvania Railroad, for some unexplained reason, neglected to install a service of horse cabs, and while there were a few vehicles owned by their drivers on call at the stations, the service was generally poor and not popular. The taxi service, however, is astonishingly cheap to those who paid horse rates, based for years on the old boundaries of the city, and therefore decidedly high.

The Taxicab Company of Baltimore, with one garage and a system of calls at the hotels, is operating twelve cars, which make an average mileage of 85 miles a car daily. Each car is on duty practically every hour of the twenty-four. Five more machines were due for delivery when the writer obtained this information, and if the business picks up, as it has recently, others will be added from time to time.

The present equipment includes five Fords, five Autocars, one Atlas and one Stevens-Duryea. The Fords will be replaced with Autocars very soon, as the order for these machines has been given, and they are expected shortly. The Autocars are equipped for four passengers, and are considerably larger and heavier than the others.

The company began rather quietly, and at first relied on calls to its garage, Eager street, between Charles and Cathedral, about as central a location as could be secured. As the service became known it was found profitable to put cabs on calls at different hotels, and now a cab is on call always at each of the larger hostelries of the city. At Union and Camden stations two cabs are kept on duty. A telephone call service to stands is being talked of. In addition, drivers on night duty are allowed to go searching, and this business is found very profitable, especially downtown late at night or in the early morning.

The cabs are equipped with the tires placed by the makers, and so far no agreement with tire manufacturers has been entered into. Very little trouble of this kind has been experienced while cars are on call. Extra wheels and other parts are not carried, as the service has consisted of short hauls, generally.

The rates are as follows:

Tariff No. II is also charged for outlying calls.

Each package, valise or trunk carried outside is taxed 20 cents. Coupon books at 10 per cent. discount are sold, giving \$10 worth of rides for \$9, etc. The only flat rate in force is from the Maryland Club, which is near the garage, to the Elkridge, and which is made for club members at a distance rate, or a trifle lower.

The meters are connected with the rear wheels, and but little trouble has been experienced. On a recent occasion some members of a delegation attending a convention attempted to play with the "in service" flag. They paid without protest, so the company rather enjoyed registering 30 cents every time one of the riders raised the signal.

The company maintains its own shop, making its minor repairs. Having no agreement as to tires, this part of the business is large. There is an agreement with makers of the cars to keep them running. Parts seem to be generally reliable, and no especial portion of any one machine has proven unduly troublesome. The mileage of the cabs, about 85, is considered remarkable in such a poorly paved city as Baltimore.

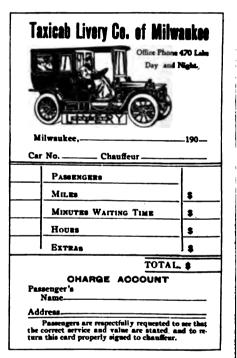
Drivers are paid 20 per cent. of collections, given their oil, and buy their gasoline at 13 cents a gallon.

The cabs are generally satisfactory, in so far as construction is concerned. It might be advisable, in some makes, to put in less costly finishing. For instance, one of the cabs came down with unusually handsome broadcloth upholstering. There were card cases, flower vases and other things. When business became brisk and this car was sent on midnight calls it soon needed refurnishing.

The service here might be improved, or rather will be improved, with heavier cabs. A telephone service to hotel and other stands, under the direct control of the company, is advisable. More advertising, too, is to be recommended. The newspaper campaign so far has been simply a statement of rates, and the riding public can be much better advised as to the inexpensiveness of the little cars. Night cab rates in Baltimore have always been excessive, and information, widely distributed, would offset the impression that the night taxi rates are higher than in the day.

# The Taxicab in Milwaukee, Wis. By W. L.

Milwaukee has never been very strong on horse drawn cabs, and has been rather slow in adopting the more modern method of transportation, the taxicab. Although there are a goodly number of private pleasure cars in use here, and quite a number of commercial cars, the renting car and taxicab have not met with much success. No private individuals operate cars with taximeters attached in the city, and there is only one company doing a taxicab business. This latter, the Taxicab Livery Company of Milwaukee, was incorporated on June 1 of the present year. The officers of the company are Dr. M. L. Henderson, president; M. Christianson, vice president, and Dr. D. I. Rowe, secretary and treasurer. The office and garage of the company is at 414 Grand avenue, in the centre of the retail portion of the city. At the present time they are operating only five cars, viz., two Maxwell, one Kisselkar, one Ford and one Rambler. The cars are equipped with various makes of tires. Franco-American taximeters are used, and



ACTUAL SIZE 31/2×51/2 HIGH.

are attached to the front wheels. No special equipment is carried for quick tire repairs, and the firm has no maintenance contracts with either tire manufacturers or car builders.

The company at present maintain one stand, on Second and Grand avenues. It is the intention, however, to place more cars in commission, and the company are negotiating with some of the leading hotels with respect to stands at their doors. The rates for one or two passengers are 50 cents for the first mile or part thereof, 10 cents for each quarter mile thereafter, and 10 cents for each six minutes waiting time. For three or four passengers the rates are 60 cents for the first mile or part thereof, 10 cents for each fifth mile thereafter, and 10 cents for each six minutes waiting. By the hour the rates are \$4 for the first hour and \$3 for each hour thereafter; \$15 for five hours and \$25 for ten hours. No extra charge is made for baggage carried inside the cab, but a charge of 20 cents is made for each piece carried on the outside.

Almost every possible method of compensating drivers is on trial. One is on straight salary, another on salary and commission and the rest are on a straight 25 per cent. commission basis. The company supplies all oils and does all repairs. The average daily mileage of each car is approximately 50. A card showing the amount collected or to be charged on each trip is made out by the chauffeur and turned in with his cash when he goes off duty. The city levies a special tax of \$5 for each car in operation, either in a taxicab or a renting service; otherwise there are no special charges for hacking.

## Taxicabs in Omaha, Neb.

While Omaha is rapidly developing into a high class metropolitan city, she has not quite reached the taxicab stage. At present there are but two taxicabs in the city. A. A. Ahlman, the owner, says, however, that so far they are not even self sustainmg. But he adds that this is due to the fact that there are not enough of them in the city to meet the demand for their services. Taxicabs, especially in these newer cities of the West, are called almost exclusively for quick transportation from one point to another to avoid the delays experienced by taking either the train or trolley cars. To make the taxicab service remunerative and popular there must be an up to date taxicab garage or stand with a sufficient numher of machines to make it possible to promptly respond to every call sent in.

While Mr. Ahlman, Chas. Thorpe, W. D. Townsend and one or two other local capstalists are organizing a company for the operation of a full line of taxicabs this winter, no immediate steps will be taken, for the simple reason that they cannot get the cabs. The big metropolitan operating companies have absolutely swallowed up the output of all the domestic as well as foreign factories.

William Drummond, one of Omaha's leading automobile dealers, says that while he has been contemplating to enter the taxicab business, he has about abandoned the idea on the ground that it is likely to prove an unprofitable investment on a small scale.

# Motor Car Post Office.

A perambulating post office having quarters on a 5 ton electric truck has been making satisfactory experimental trips in Los Angeles with a crew of four mail clerks, who, despite the handicaps imposed upon them by the lack of facilities, have been able to sort, stamp and tie out 20,000 letters daily in the time the mail usually spent on the way from the mail boxes to the post office and its sub-stations. The. trips are being continued under the direction of Superintendent of Mails H. A. Shelton, and may lead to the permanent

installation of a sub-post office on wheels in the business district.

But few changes were necessary in the truck to change it into a post office. A bench extending the full length of the truck was placed along one side, with a mail rack backing against the driver's seat and pouch holders in front of the rack. Four clerks found room on the truck. Mail was collected along a specified route from boxes, carriers, and from the chutes of office buildings. Instead of going to the main post office, the letters were at once stamped by one of the clerks, while the others sorted the letters according to destination. tied them in bundles, and placed them in pouches ready for delivery. At the end of the trip the made up mail was delivered either to the sub-station nearest to the depots or taken directly to the trains.

The average of the mail handled in the itinerant office varies between 17,000 and 20,000 pieces daily, but this average can be much increased by installing the proper facilities. Electric lights have been placed on the truck for night work, and an electric stamping machine is to be put in and connected with the batteries, performing the task of stamping the letters in one-third of the time required by hand work. By a few changes in the body of the truck the space available for the clerks could be increased, and their working speed acceler-

## Stop Taxicab Service.

The Western Motor Car Company, of Los Angeles, has gone out of the taxicab business because the service did not pay in Los Angeles. The twenty cars operated by the company for a year have been sold to the Taxicab Company of California for use in San Francisco, and it is hardly likely that another firm will venture into the Los Angeles taxicab field for the present.

Los Angeles refused to patronize the taxicabs. When the cars first appeared on the street a year ago the prevailing rate of Eastern cities, 60 cents a mile with a charge both ways, was demanded, but the patronage was so slight that the owners were forced to reduce the rate to 40 cents per mile and charge only for the distance actually traveled by the possenger, without adding the return mileage. Even with this reduction the fares were scarce, and the service was conducted at a loss.

A number of reasons are given for the lack of taxicab users in Los Angeles. The ideal weather prevailing all the year around is one of them; the large number of touring cars and runabouts, in proportion to the population, is another reason. The excellent street car system and the absence of the hurry spirit prevalent in the business centres of the East account for another portion of the taxicab loss.

## Rural Motor Mail Collection.

W. A. Johnson, a rural mail carrier in Ottawa, Kan., some time ago disposed of his three horses and wagon, and bought

a Brush runabout for covering his routes. The cost of the car was only slightly more than that of his horse and vehicle equipment. Mr. Johnson covers a route 25 miles in length, leading through the hilly district west of Ottawa. He has eighty-four mail boxes to cover every day, and with the runabout he finds that he can make his rounds in three hours, while with horses it was a big day's work.

# Collect Peddlers' License by Motor.

The supervisors of Los Angeles County have ordered the purchase of an automobile costing \$3,000 to assist the tax collector in collecting the license fee of peddlers on the county roads. Acording to the tax collector, his deputies now reach but a small portion of the peddlers, and the loss of revenue, he stated, would pay for the motor car in three months. The tax collector's automobile will make the seventh motor car owned by the county.

## Commercial Notes.

Ronk & Searles, plumbers, at Delavan, Wis., have purchased a Randolph delivery truck for their business. Mr. Ronk drove the truck from Chicago to Delavan.

The Palace Livery and Boarding Stable, Peoria, Ill., have decided to enter the taxicab field, and have placed an order for cabs with the Sultan Motor Company, of New York.

Elmer E. Day, of Port Angeles, Wash., has recently purchased a five passenger touring car, which he intends to use in connection with his livery and stage line to Lake Crescent.

The McAllister - Newgood Company, Minneapolis, Minn., have placed in service the first taxicab in the city, a Ford. They will shortly have eight or ten cabs in service from a stand at the new Radisson Hotel.

An automobile freight service has been inaugurated between Lagona and Santa Ana, Cal. A 35 horse power car is used, which covers the distance of 20 miles in less than two hours. This machine will supplement the passenger service of two machines, which have been in operation for some time.

George W. Lindermuth, of Dayton, Ohio, has put in service a twenty passenger motor sightseeing car between Dayton and Belmont. Mr. Lindermuth will shortly receive a second similar car, and will operate the two on a regular schedule, charging the same fare as is charged on the inter-urban electric line.

A 1910 model Peerless touring car has been received by the city of Milwaukee through the agency of August Jonas Automobile Company for the use of the common council committees and the board of public works jointly. The city clerk is empowered to issue certificates for the use of the machine. Frank Toenhardt, for two years chief elevator operator in the city hall, has been named official driver of the car.

## A Renard Train Service in France.

BY FRANK C. PERKINS.

The accompanying illustrations show the Renard train of passenger and freight cars hauled by motor tractor, running between Boulogne, Wimereau, Ambleteuse and Andresselle, France. The motor tractor is equipped with a 75 horse power four cylinder engine, which supplies power to the cars by means of a shaft which extends through the whole train, each carriage or omnibus being practically independently driven, although from a common source of supply. The cars have three pairs of wheels, the end wheels being used for steering and the centre pair of wheels as drivers, the power being taken by means of a gear box from the shaft which runs through the train and provided with universal

In order that this "multiple-unit system" may be made practical it was necessary to provide means to keep a definite portion of the load upon the driving wheel, and a special system of spring compensation was therefore adopted as one of the most important features of the Renard road transportation system: The compensated suspension provided enables any one of the six wheels to surmount an obstacle without imposing more strains upon the spring immediately above it than is indirectly applied to either of the other two springs on the same side of the frame.

The Renard road train has recently come into extensive use in Holland at Utrecht as well as at The Hague; also in Austria-Hungary at Budapest. A number of these automobile trains have also been placed in service in Servia, Germany, Persia, Spain, Portugal, Turkey, Roumania and Bulgaria.

It is stated that these Renard trains are to be used on the Indian frontier for commissariat and transport purposes as well as in Burmah and Ceylon to act as

feeders in the rice, timber and tea districts and in times of famine.

As compared with rail vehicles, the Renard train possesses many advantages, including low first cost for establishing the service, as well as flexibility and safety on hilly roads. It is maintained that there is no skidding and almost no side slip, with no undue wear and tear of roads. There is no fixed limit to the weight or length of the train, with absolute single handed control from the locomotive, greatly reducing the cost of operation. There is said to be no difficulty in backing out of awkward positions, and it is said that the train is able to travel over roads that are unsuitable for exceptionally heavy traffic, such as traction engines, on account of weakness of bridges or inadequacy of the road foundations. There is a great advantage in the lightness possessed by this train, and the steering arrangement, comprising a series of tillers connecting the front of each car with the back of the preceding one, is such as to cause every vehicle to follow accurately in the track of the locomotive, and giving the impression that the train is being run on rails.

# Carbonic Acid Gas Tire Inflaters.

Another tire inflation apparatus working with carbonic acid gas has been brought out in Switzerland, and is marketed under the trade name "Sodax." It consists of a brass tank about 7 inches in diameter by 14 inches high, in which is contained a wire basket that can be moved up and down from the outside. This basket is filled with ordinary soda (hydrogen sodium bicarbonate). About half a quart of water, slightly acidulated with a small bottleful of sulphuric acid, is poured into the tank and stands about 134 inches high in it. When the inflater is to be used it is first connected by a tube with the tire valve, and the wire basket is then lowered into the liquid. Gas generation begins at once, and when the pressure gauge shows the desired pressure of inflation the tube is disconnected. The gas produced, which is evidently carbonic acid gas, is said to be neutral, heavier and denser than air, and to have a preservative effect on the inner tubes. It has been shown, however, that the walls of the inner tubes allow carbonic acid gas to penetrate through them faster than air.

Vanderbilt Cup Race Set for

October 30.
The Motor Cups Holding Company held a meeting at the office of Wm. K. Vanderbilt, Jr., in New York, on Monday of this week, and unanimously decided to hold the Vanderbilt Cup Race again this year, setting the date for October 30. It will be held over a shorter circuit than last year, less than 15 miles in length, partly over the Long Island Motor Parkway, and partly over State roads, but the grand stand, and the start and finish will probably be at the same point as last year. Practically all the details of the race were settled at the meeting. Since the formation of the Motor Cups Holding Company, several weeks ago, the manufacturers who patronize races have been sounded as to their willingness to enter the event, and the result was so encouraging that it was decided to go ahead with the preliminaries. The details will probably be announced during the latter part of this week.

# New Garage for Manchester, N. H.

The Cooke, Fitz & Dillingham Company (Inc.), composed of Messrs. F. V. Cooke, E. C. Fitz and N. S. Dillingham, of Manchester, N. H., agents for Cadillac cars, will take possession of their new fireproof garage about November 1. This garage is located on Lowell street very near Elm street, the principal business thoroughfare of the city, and will be 150x45 feet in size, two stories high in the rear, and one story and basement in front. Brick walls, steel beams and cement floors will be used. and a strip of land 30 feet in width on one side of the building will be utilized for a rear approach, an outside washstand and a gasoline supply for cars which are not driven into the building. This garage will do a regular and transient business, and will be equipped in the most approved style. Messrs, C. C. and J. C. Hayes are putting up the building to lease to the Cooke Com-

A large salesroom is maintained by this concern at 1222-1224 Elm street, and also another fireproof garage at 16 and 18 Myrtle street, which is reserved particularly for the accommodation of their Cadillac customers.

Arthur Patterson has been appointed receiver for the Ovington Motor Company. importers of motorcycles, 2234 Broadway, New York, and has been authorized to continue business twenty days. The assets consist of motorcycles and supplies, \$1,000. and accounts, \$2,500.



FRENCH AUTO TRAIN AT AMBLETEUSE LA CHAPELLE SAINT PIERRE.



# Speedway Law Introduced in British Parliament.

A rather important bill was introduced in the British House of Commons by Secretary of the Treasury Lloyd George about a fortnight ago. It provides for the creation of a new body, to be known as the Road Board, which is to have powers to improve existing roads with respect to their fitness for motor traffic, and to construct new roads for motor traffic exclusively. This new bill is apparently part of the Lloyd George program, which includes the taxation of gasoline used in automobiles and the compensation of motorists for this tax by the diversion of the revenue derived from it for road improvement purposes.

The bill provides that all projects for the construction of special roads must be approved by the Treasury Department. The Road Board may consist of any number of members the Treasury may deem suitable, but only one, either the president or vice president, is to be a salaried member. The powers of the Road Board include the construction and maintenance of new roads, and the making of advances or grants to highway authorities for the construction of new roads or the improvement of existing roads, for facilitating motor traffic. The powers of the board will be similar to those of the County Councils, except that it cannot impose any taxes. The board may regulate the traffic on the roads it constructs. It has the power to admit other than motor traffic to these roads, and to exact tolls from such other traffic. The board also has power to acquire land on both sides of any proposed new highway to a distance of 220 yards from the middle of the proposed highway. so that it may profit by the appreciation of values in the vicinity of these highways. The Road Board may also sell, lease and manage the lands acquired in accordance with this act, subject to the approval of the Treasury Department. The expenses of the board, in so far as sanctioned by the Treasury, are to be defrayed out of the Road Improvement Grant, and all sums received by the Road Board are to be turned over to the Road Improvement Grant. The Road Board is to make an annual report to the Treasury. The regular automobile law is to apply to the special roads constructed by the Road Board, the same as it does to public roads, with the exception of that section which limits the permissible speed.

# Did Not Want His Car's Speed to Be Ascertained.

A rather peculiar incident arose during the trial of a speed case in England recently. Defendant was accused of driving at a rate of speed exceeding 33 miles per hour, while he himself claimed that his speed had not been more than 10 to 12 miles per hour, and submitted expert testimony to the effect that the car was not capable of doing better than 25 miles per hour. The jury was undecided, but gave the defendant the choice of two alternatives: They would either dismiss the case on payment of costs or the defendant could turn over his car to an impartial expert to determine what its speed limitations were. Defendant preferred to pay the costs.

# Cab Chauffeurs to Prison for Robbing Woman Fare,

Two New York cab chauffeurs, William B. Curzon and William H. Young, were sentenced on Tuesday to serve not less than two and a half years and not more than five years in the Sing Sing Prison. They were arrested over a month ago charged with having attacked and robbed a woman whom they picked up in their automobile as a fare. They took \$25 from her.

## Legal Notes.

About 500 driver's registration badges have been received by the Indianapolis city controller, and have been issued to the first 500 persons applying for registration. About 1,000 have applied for registration to date, but owing to a delay in getting the badges the ordinance requiring registration is not being enforced at the present time

At the coming session of the Indiana Legislature a bill will be introduced making it the duty of county commissioners to post guide and danger signs on all public highways. There is much agitation among automobile interests for such a law, as the Indiana highways have no signs at the present time. Efforts will be made to assess a penalty if county commissioners fail to comply with the law.

# Petition to Have National Park Roads Opened to Autos.

A petition has been sent to the Secretary of the Interior at Washington, D. C., by the California Promotion Committee, requesting that certain roads in the Yosemite National Park be opened for the limited use of automobiles, so as to enable many people who would otherwise not be able to visit the park to view its scenic wonders. The committee had the petition prepared last May, and it has since been signed by many commercial organizations and others, having been circulated all over the State.

# Firestone Tire Company to Build New Plant.

At the recent regular annual meeting of the Firestone Tire and Rubber Company, Akron, Ohio, the following officers were elected: H. S. Firestone, president and general manager; Will Christie, vice president; S. G. Carkhuff, secretary, and L. E. Sisler, treasurer. The annual report is said to 13d of mode 30 sales up as easily us mous cent. over the previous fiscal year. The company have purchased a 15 acre tract of land near their present plant, on which they will erect a large new tire factory.

# Meteor Motor Car Company's Factory Burned Out.

The Meteor Motor Car Company, Bettendorf, Ia., had a disastrous fire on September 9, which completely destroyed the entire factory, with the exception of the office building. We are informed that all drawings, patterns, jigs, special tools, etc., in fact all necessary material for starting work on 1910 models, were saved, and the company will do everything in their power to get work started again. How long it will be before they will be in actual operation again it is impossible to say at this time.

# Smiths Resign from Olds Motor Works.

Frederick L. Smith and Angus Smith, vice president and general manager and secretary and treasurer, respectively, of the Olds Motor Works, Lansing, Mich., have resigned from the company, and Bentley J. Mead, general sales manager of the General Motors Company, has been appointed secretary and general manager of the firm. The Olds Motor Works was one of the two firms which originally composed the General Motors Company. The Smiths have been connected with the Olds Motor Works since its establishment in Detroit about a decade ago. Ralph R. Owen, factory manager of the Olds Works, has also resigned, and it is reported that the Smiths and Owen will organize a new company for the manufacture of automobiles in Detroit.

# Supplementary Spiral Spring Patents.

In our issue of August 25 appeared an item regarding an injunction suit brought by the Supplementary Spiral Spring Company, of St. Louis, against M. H. Cormack & Co. and M. H. Cormack, of New York, in which there are said to be several errors in the statements made to us by Cormack & Co.

The St. Louis Supplementary Spiral Spring Company patents Nos. 807,612 and 901,578, respectively, are actually issued, and relate strictly to supplementary spiral springs; while the patents of J. Hector Graham, which were quoted by Cormack, are said to relate, one to a car truck and the other to a snow plow.

Patent No. 807,612 was granted to the Supplementary Spiral Spring Company on December 19, 1905, and they claim that the interference which Graham filed against it is based on an application for a patent bearing a very close resemblance to their patent No. 807,612 as to the drawings and language.

M. H. Cormack & Co. have sold out to J. H. Graham, of Boston, to avoid liability.

Non-Slipping Metal Tired Truck

Wheels.

wheels of motor trucks non-slipping has

been discovered in France, and is described

in the bulletin of the technical committee

of the Automobile Club of France. In the

case of a large truck fitted with steel tires

8 inches wide considerable trouble was ex-

perienced in getting sufficient traction in

snow and on greasy pavements on grades.

The wheels were shod with semi-hard steel

plates, about three-quarters inch thick, with

oblique transverse edges, and a distance of

about three-quarters inch between adjacent

plates. These plates were riveted in place.

In order to prevent slipping aluminum rods

were pressed into the spaces between the

plates, so as to project very slightly above

the steel plates. In service the steel plates

slightly spread and hold the aluminum rods

very firmly. In service the projecting por-

tions are headed over, and though they pro-

jected only about one-sixteenth of an inch

it was found that the truck then had per-

fect traction, even on snow and ice. It was

experimented with for about three months.

In another case the same treatment was an-

plied to the driving wheels of a six wheeled

truck. It will be understood that the condi-

tions of traction of such a truck are particu-

A new method of rendering metal tired

# OUR FOREIGN EXCHANGES ➤



# Austrian Commercial Vehicle Contest.

The Austrian Automobile Club will conduct an international contest for commercial motor vehicles October 3 to 17. The contest will comprise a test of reliability and a determination of the fuel consumption per ton kilometre of useful load. The contest is open to all classes of utility vehicles driven by explosion motor, including doctors' vehicles, taxicabs, light and heavy trucks and road trains.

The rules, which have just been made public, require that the bodies of the vehicles must be suitable for the purpose for which the vehicles are to be used under ordinary conditions. In the case of vehicles for the transportation of passengers the seats must have a minimum width of 18 inches. In the case of omnibuses if two classes are provided for the respective spaces must be separated by a partition. The windows in the front wall must be closed during the runs. In case any panes in these windows should break during the test they must must be replaced by boards or heavy cardboard.

Every vehicle must be provided with a fuel tank of sufficient capacity to complete the daily stage without replenishment of the fuel supply. The competing vehicles will be divided into three groups, and will be tested on three closed routes of a total length of approximately 750, 1,000 and 1,625 miles, respectively. The circuits will be so laid out that the vehicles of all classes will stop over night at the same points. The division into groups and classes is as follows:

### GROUP I.

(125 to 145 m, p. h. per day.)
1. Doctors' cars and motor taxicabs.

### GROUP II.

(75 to 94 m. p. h. per day.)

- Closed omnibuses with seats for eight to fourteen passengers.
- Closed omnibuses with seats for more than fourteen passengers.
- 4. Delivery wagons for 1,100-2,200 pounds useful load.
- 5. Trucks for 3,300-4,400 pounds useful load.

# GROUP III.

(50-62 m. p. h. daily.)

- 6. Trucks for 5,500-7,700 pounds useful load.
  7. Trucks for more than 8,800 pounds useful load.
- 8. Motor road trains with one or more trailers.

All vehicles must be submitted to the committee in running order on October 1. The vehicles will be loaded exclusively with ballast, consisting of substantial boxes of 220 pounds weight each, fitted either with gravel, broken stone or metal bars. The load in the case of omnibuses is to consist of ballast in durable sacks of 66 or 154 pounds, respectively. A sack of 154 pounds is to represent a passenger, and a sack of 66 pounds the baggage. Loss of ballast, as well as damaged seals, will lead to disqualification.

All competing vehicles are to be accompanied by official observers, whose assignment will be determined each day by lot. Each observer will be furnished an observer's entry book, which it will be his duty to fill out during the run, and to deliver to the committee in charge each evening inside of an hour after his arrival. The observers are also required to see to it that their vehicle carries the prescribed load; that it complies with all legal requirements; that all necessary repairs are made with equipment carried along on the car, and that in the fuel consumption trials none but officially measured fuel is used.

The competing cars will be started each morning at 7 o'clock, in the order of their estimated speed, at intervals of two minutes. At night the vehicles will be stationed in a closed park to which only the committee in charge, the observers and certain other specified persons will have access. The driver and mechanic of competing vehicles will be admitted to the park one half hour before their starting time in the morning.

The following minimum speeds must be maintained by the competing vehicles:

Doctors' cars and taxicabs, 151/2 miles per hour.

Delivery wagons and trucks:

Useful load up to (pounds)...... 2,200 3,300 4,400 5,500 6.600 7,700 8,800 11,000 and over. With steel tires (m. p. h.)...... .... 6½ 6 5.6 5.3 5 4.4 With rubber tires (m. p. h.)..... 11½ 10 9.4 8.4 7.5 7.2 6.9 6½ Motor road trains, 4.4 m. p. h. on steel tires, and 5.6 m. p. h. on rubber tires.

Every contestant is required to inform the committee in charge in advance of the kind and quantity of fuel required by his car, which will then be supplied by the committee at the different stopping points at the expense of the contestant. The same fuel as used during the fuel consumption contest must be used throughout the trial, and it is not permitted to use another fuel for starting purposes. Anti-skidding devices may be secured to the driving wheels, but the time used in applying and removing them will be counted as running time.

The fuel consumption contest will be held October 12, 13 and 14. The contestants are required to provide all of the connections of the fuel system, such as filling caps, drain cock, carburetor connection, with means which permit of the ready application of seals. For the different fuels admissible, viz., gasoline, heavy gasoline, benzol and kerosene, the current prices on October 1 will be charged in making up the conomy records.

Numerous prizes, both cash and plate, are being offered in connection with the contest. Exhibitions of the competing vehicles are to be held in Prague, Reichenberg and Vienna. The entry fees vary from 150 crowns for cars in Class 1 to 400 crowns for cars in Class 8, up to the preliminary closing of entries on September 15, and between twice these amounts from that date up to September 25. Entries are received by the general secretary of the Austrian Automobile Club, Vienna I, Karntnerring 10.

larly unfavorable, for the reason that a smaller portion of the load is carried on the driving wheels. Under these conditions it was practically impossible to ascend a grade, especially when the truck was empty. The wheels were fitted with aluminum rods, as described above. In the course of a few days the aluminum had worn even with the outer surface of the steel plates, and since that time the truck has been driven without the least trouble from slipping. It seems that the result obtained is due to the malleability of aluminum, which permits the peb-

# Duty Free Reimportation of Automobiles into Germany.

bles to imbed themselves in it.

The German Minister of Finance has given his permission to the duty free reimportation of automobiles which have temporarily been taken out of the country, on the basis of the now customary export certificates, without the application of seals to the automobiles, under the following conditions: The certificates must bear the name and place of residence of the owners, as well as a precise description of all the more important characteristic features of the car, including the approximate weight of the car, its number, color of chassis (i. e., the wheels and the frame), the number of the chassis, the type and the color of the vehicle body, the number of seats, the character and color of the upholstering, as well as any special characteristics, such as insignia, initials, etc. Cars may be reimported at any office.

# Experimental Road Work in Ohio.

State Highway Commissioner J. C. Wondders, of Ohio, will this week commence the work of putting down the State's share of the one mile of experimental road which is being constructed just east of Columbus, with a fund of \$10,000 furnished by the last Legislature. The results of this test of road making materials will be watched with interest by road makers in all parts of the country, as, aside from a somewhat similar experiment being made by the Federal Government, it is the only one of its kind in the world. The Ohio test road differs from the Government road in the length of the strips of various kinds of road, and in that the State has gone into the market and paid cash for all the materials it has used, while the Government is making its tests with donated material, it is said.

Eleven manufacturers of twelve different kinds of road surfacing or dressing agreed to send experts to superintend the work of putting the material on a stretch of road, and nine of them have done so. The tenth will start work this week, and the highway department is endeavoring to get the eleventh to send on a man as soon as possible, as the material is at hand, ready for use. Three sections will be built after plans of the State Highway Department by the department itself, to test its methods in comparison with the patented or manufactured materials or processés.

The department started on the work with the idea of getting the material such as is offered regularly on the market, and not an extra good quality, selected and prepared with care—if this was possible. It then proposed to have this material applied under the direction of an expert connected with the company manufacturing it, so that the conditions of putting it down would be the best possible, and there could be no complaint that the road might have worn better had it not been built by inexperienced men. Any of the manufacturers would have donated the material for the test, but the State preferred to buy, and would accept no donations.

Sections of road have been built with material manufactured by the following firms, the material and its description being also given:

Pioneer Asphalt Cement—An asphaltic product mined in Utah by the American Asphaltum and Rubber Company, of Chicago. This cement is applied to the top course.

Tarvia X—A coal tar preparation manufactured by the Barrett Manufacturing Company, of New York. It is applied by compressed air while at a temperature of from 250° to 300° Fahr. to the top course as a filler.

Tarvia B—A coal tar preparation manufactured by the same company. It is applied cold as a surface treatment, and is described as of "less tenacity and lower viscosity than Tarvia X."

Liquid Asphalt—Another asphaltic preparation, a filler, which is manufactured by the Indian Refining Company, of Cincinnati. It is a manufactured product "carrying in solution 60 to 65 per cent. of asphalt fluxed with other constituents of a non-volatile nature."

Fairfield Refined Asphalt Cement—A product consisting of 88 per cent. bitumen, and 12 per cent, mineral product, used as a filler. It is manufactured by the Impervious Product Company, of Baltimore.

Glutrin—A by-product of the manufacture of wood pulp. It is mixed with water, and applied by the use of a sprinkling wagon to an ordinary water bound macadam road, becoming hardened as it dries, which is very shortly after application. Manufactured by the Robeson Process Company, of Au Sable Forks, N. Y.

Carbo-Via is a coal tar product, used as a filler, manufactured by the Continental Bitumen Company, Toledo.

Road Coating—A tar preparation. It is used as a bituminous binder. Manufactured by the United Gas Improvement Company, of Philadelphia.

Asphaltoilene is described as "a product equivalent to pure asphalt dissolved in petrolene." It is a filler manufactured by the Good Road Improvement Company, of Cincinnati.

Wadsworth Macadam is a top dressing made from ground Kentucky asphalt, containing not less than 8 per cent. bitumen. It is manufactured by the Wadsworth Stone and Paving Company, of Pittsburg.

The "Petrolithic" road will be built this week. Mr. Frees, the treasurer of the company, has gone to Indianapolis to get some additional needed machinery, and the company's chief engineer, Mr. Postle, of San Francisco, will be in Columbus this week to superintend the work. This is a process of treating a road with California asphaltic oil by means of the Petrolithic rolling tamper. This work is done by the Petrolithic Pavement Company, of Los Angeles, Cal.

The three sections of the road to be built by the State Highway Commission, under specifications laid down for counties working under direction of the department in expending State funds appropriated by the Legislature for good roads, will be concrete macadam, gravel concrete and the ordinary water bound macadam. The concrete macadam is a process in which a grout of cement is rolled into the voids of an unfilled macadam road. The gravel concrete road is a concrete roadway built of gravel and cement. The State Highway Commissioner has built concrete macadam streets in Bellefontaine, which have been in use for some time, and have shown good wearing quality, the objection to them being that they are too slippery.

One section of the new experimental road has already failed—as each section is thrown open to travel as soon as it is constructed. This section is that prepared by the Standard Oil Company. The company

has two preparations, and there seems to be a misunderstanding as to which it was intended to use on this particular stretch. One of them is Standard Macadam Asphalt Binder, "a heavy product, almost solid asphaltum," poured upon the top layer of the stone. The other is Standard Asphalt Road Oil, "a manufactured product containing from 30 to 50 per cent. of petroleum asphalt"—a surface treatment. Whichever the company used or intended to use, its superintendent admits it is not satisfactory, and asks permission to build another section, to make another test.

Taroid is a coal tar pitch prepared in liquidized form, and used as a binder. The State has the material on hand, but the company has sent no one to superintendent its use. It is prepared by the F. J. Lewis Manufacturing Company, Chicago. If a representative of the company does not come to superintend, the material will not be used, in all probability.

The experimental road is located about one mile east of Columbus, and is known as Nelson avenue. It extends from St. Mary's Academy at Shepard, a suburb, and extends southwardly to the corporation line of Columbus. It connects at its northern terminus with Fifth avenue, the principal thoroughfare east and west on the north side of Columbus, and at its southern end with Broad street, the principal residence street of the city. It is thus a much traveled road, as it is a part of a circuitous route through the prettiest residence section, out through the country to Shepard, and back to Columbus' principal business street, High street. It is used a great deal by automobiles, and this was one of the reasons why it was selected.

The various sections are laid as a continuous road, so that one section will receive just as much wear as another. The sections are 400 feet long, and the roadway is 16 feet in width. Of the \$10,000 allowed by the Legislature, the Highway Commissioner has remaining \$4,407.98. A visit to this road will be one of the events on the program of the coming convention of the American Road Makers' Association.

## Trade Literature Received.

Thermoid Rubber Co., Trenton, N. J.—Dealers' price list of tires and inner tubes.

Winton Motor Carriage Co., Cleveland, Ohio.—Catalogue of the 1910 Winton Six.

Mercer Automobile Co., Trenton, N. J.—Circular describing the Mercer automobile.

The Sharp Arrow Automobile Co., Trenton, N. J.—"The Sharp Arrow Automobile."
Firestone Tire and Rubber Co., Akron, Ohio.—

Booklet on Firestone demountable rims.

The Edgemont Machine Co., Dayton, Ohio.—
Catalogue C of the Edgemont friction clutch.

Ewing Automobile Co., 1303 Citizens Building, Cleveland, Ohio.—Advance sheets of Ewing 1910 catalogue.

Universal Rim Co., 1467 and 1469 Michigan avenue, Chicago, Ill.—Circular of the Universal demountable rim.

Peerless Motor Car Co., Quincy avenue and E. Ninety-third street, Cleveland, Ohio.—Booklet on the equipment furnished for Peerless Models 27 and 28.

# MINOR MENTION



The Powel! Supply Company, Omaha, Neb., have secured the agency for the Goodyear air bottle for inflating tires.

The Acme Rubber Company, Trenton, N. J., are erecting two new wings, one 250x 60 feet and the other 100x40 feet, which they expect to occupy about October 1.

The Western Rubber and Supply Company, Los Angeles, Cal., have moved to 1011-15 South Olive street, a district where many garages have recently been located.

The capital stock of the John W. Brown Manufacturing Company, Columbus, Ohio, has been increased to permit of enlarging the automobile lamp department. Additional machinery is to be installed.

The E. Z. Auto Go-Cart Company, of Monroe, Wis., has purchased the plant of the Blue Label Cheese Company at Monroe, and will remodel it. The company recently moved its plant to Monroe from Beloit, Wis.

Nordyke & Marmon, of Indianapolis, Ind., have come forth with a statement to the effect that they will never again participate in track races. They have never built any racing cars, and do not intend to do so in the future.

Rauch & Lang, of Cleveland, Ohio, plan to built 1,000 electric vehicles the coming season. These cars are to be equipped with a special cushion tire made by the Motz Tire Company, of Akron. This tire has a double tread with corrugated surface.

It is reported from Saginaw, Mich., that the General Motors Company have secured an option on the plant of the Jackson-Church-Wilcox Company, which for some time has been manufacturing parts for the General and other automobile companies.

The new plant of the Waukesha Motor Company, of Waukesha, Wis., is nearing completion, and will be ready for occupancy about November 1. The main building is one story high, 85x120 feet, with a two story wing, 30x40 feet, all of solid brick construction.

The Moline Automobile Company, East Moline, Ill., has let the contract for the erection of an additional building, 100x125 feet, and four stories high. This will give the company 50,000 square feet of additional floor space, which will be used for chassis and body assembling, and as a warehouse.

The West Milwaukee shops of the Chicago, Milwaukee & St. Paul Railway Company have just turned out fifty freight cars designated "automobile" type, which will be placed in the motor car transportation service at once. The company, since opening its Pacific Coast extension, has had a heavy motor car traffic. The cars are 41 feet long, with especially large side and end doors,

permitting of loading and unloading motor cars without twisting, cramping or scratching.

The Lexington Automobile Company, of Lexington, Ky., is considering removal to Connersville, Ind.

Jas. F. Hill, of Fleetwood, Pa., has invented a new gasoline engine which is claimed to give an exceptionally large output in proportion to its size. It works on the scavenging principle.

The recently incorporated Badger Auto Company, of Oshkosh, Wis., plans to build a line of motor trucks. The company has leased the Termaat & Monahan Company's plant at Oshkosh. The owners of the latter company are included in the list of incorporators of the new concern.

Work has been begun at the factory of the Lion Fence Company, Adrian, Mich., to fit it up as an automobile factory for the manufacture of the Gyroscope car. It is stated that \$15.000 of the stock of the Lion Motor Company, as the new concern is to be known, has been subscribed for.

E. G. Atkins, Minneapolis, Minn., has designed a new floatless carburetor in which the gasoline adjustment is automatically varied with the throttle adjustment. He is now organizing the Atkins Manufacturing Company for manufacturing the device, and will locate in Minneapolis or Duluth.

The Lexington Motor Car Company, Lexington, Ky., which was incorporated about a year ago, with a capital stock of \$50,000, at a meeting on September 2 decided to increase its capitalization to \$100,000. The officers of the company are: F. T. Bryan, treasurer, and Fred N. Coats, Kinzea Stone, J. C. Moore, B. F. Stone, V. K. Dodge and V. A. Bradley, directors.

The Napier Company of England has brought out a signal horn operated by the usual rubber bulb, which is claimed to be unaffected by dirt and water. The horn is substantially of spiral shape, with the mouth at the centre. It is claimed that any water which by chance enters the mouth runs out again and cannot possibly reach the reed. The wind rush is broken, and the consequent muffling of the horn obviated.

Jas. Cunningham, Son & Co., of Rochester, N. Y., manufacturers of heavy horse vehicles and hearses, have been reorganized with a capital stock of \$1,200,000, and will take up, in addition to their horse vehicle business, the manufacture of automobiles. Experimental work with automobiles was begun some months ago, and now the regular manufacture of these machines is to be taken up in the same factory as that of the horse vehicles.

The Cataract Motor Company, of Paterson, N. J., whose incorporation we announced in our last week's issue, plan to manufacture motors and change gears for automobiles, according to manufacturers' specifications. Several of the incorporators were formerly connected with the Rogers Locomotive Company, of Paterson. It is the intention to locate in Paterson if the

citizens of that city will subscribe for \$200,000 of the \$350,000 stock of the company.

The Continental Caoutchouc Company has opened a Boston branch at 895 Boylston street, in charge of E. H. Kidder.

An automobile sales building is being erected on a plot on Euclid avenue, Cleveland, Ohio, just east of East Twenty-second street, which will cost approximately \$40.000. The property is 99x198 feet, and has been leased for a long term of years, with an option to buy in ten or twenty years.

The R. L. Kenyon Company, of La Crosse, Wis., manufacturer of tops, cushions, seats and outfitting for motor cars and boats, has practically decided to move to Waukesha, Wis. The capital stock will be increased from \$25,000 to \$50,000. The Waukesha Business Men's Club is promoting the removal.

The Remy Electric Company, Anderson, Ind., will establish branch selling offices in Kansas City and San Francisco on January I, 1910. The San Francisco branch will be in charge of Edward F. Willett, now connected with the company's New York selling office, while the Kansas City office will be managed by Ross E. Luellen.

The York Automobile Company, of York Pa., is reported to be considering removal to Trenton, N. J. President O'Connor, of the York Company, has recently made a number of trips to Trenton, and F. J. Wetzel, of the Wetzel Mechanical Stoker Company, of Trenton, has been active in the interest of the company in Trenton.

New York State will be represented at the National Good Roads Convention at Cleveland, September 21-23, by six delegates, viz., S. Percy Hooker, Robert Earl and Thomas Warren Allen, of the State Highway Commission, and Frank N. Godfrey, of Olean; W. Pierrepont White, of Utica, and Albert L. Shattuck, of New York.

The Sterling Machine and Stamping Company announce the removal of their plant from Vermilion to Wellington. Ohio, and will open their new factory at Wellington with a full force about September 20. The company manufacture gas generators, tire lugs and other stamped parts of brass and steel. They will add a brass foundry to their plant.

For the Frank A. Munsey reliability run from Washington to Boston and back, September 21-29, thirty-seven entries were received up to the time of closing on September 11. The competing cars will be run in six divisions, and prizes will be awarded in each division, in addition to a general sweepstake prize for the car making the best score. The entrance money will be divided among the drivers of the six winning cars.

It is the intention of the Swiss Government to require all vehicles to be equipped with tachometers, which are to be of such design that the speed can be plainly read off by all persons in the vicinity.

Garage Notes.

C. H. Nass is erecting a garage in Esmond, N. Dak.

A. R. Mires has purchased the Young Garage in Modesto, Cal., and will install a repair shop.

I. D. Hawley, St. Cloud, Minn., plans to add an addition to his garage to double its capacity.

N. J. G. Morrison and W. W. Shelp have bought the garage of O. V. Armstrong, Litchfield, Minn.

The Berks Auto and Garage Co., Reading, Pa., are adding a machine shop, 100x60 feet, to their sarage.

Gus Jenevein, San Mateo, Cal., is erecting an automobile repair shop near the Junction House in that city.

John Moberg has let the contract for the erection of a garage building in Bemidji, Minn., to cost about \$4,000.

Fred Smith will open a garage in Xenia, Ohio, in the Whiteman Building, corner of Whiteman and Second streets.

The Barkman Electric Co. of Salt Lake City, Utah, has changed its name to the Standard Electric and Automobile Co.

Otto Scherer, Palmyra, Wis., plans to erect a garage building, 52x72 feet. It will include a repair room and a paint shop.

E. L. Leinbach, who represents the Oldsmobile in Baltimore, Md., has decided to erect a modern garage and salesroom building.

Rex Lindemann, Endilin, N. Dak., has engaged in the automobile business and taken the agency for the E-M-F and the Overland cars.

Will Cooper, Fort Jones, Cal., has sold his interest in the Yreka Garage to his partners, and will be succeeded by Rolland Baker as manager.

The Vale & Menhall Co., Beloit, Wis., has been organized to conduct a garage. The new company will be agents for the Marion and Overland automobiles.

The Mich-Stair Automobile Co., Minneapolis, Minn., has purchased a building site on Eighth street and First avenues North, and will erect a garage in the near future.

E. C. Lou has bought the Bailey Street Garage in Whittier, Cal., from C. W. Harvey. Mr. Lou was formerly connected with several automobile factories in Cleveland. Ohio.

Thompson & Slattery, Spirit Lake, Ia., have bought the H. A. Wilsey garage, and took possession on September 1. An addition is now being erected at the south side of the building.

The Horton Wagon Manufacturing Co., Augusta. Ga., at a recent directors' meeting decided to erect a garage building on Ellis street. It will be fully equipped with all modern garage conveniences.

Frank P. Cook, Torrington, Conn., is erecting a two story brick building, 49x58 feet, with a tar and gravel roof, of which the first floor is to be used for a garage and the second floor for tenement purposes,

The Dietrich Motor Car Co., of Allentown, Pa., are erecting a three story concrete garage building. 285x80 feet, on Linder street, between Ninth and Tenth. The garage will contain 70,000 square feet of floor space.

The Lawfer Automobile Co., Allentown, Pa., have given up the agency for Ford cars, and taken on the Hudson and Chalmers-Detroit. They have a garage at Twelfth and Hamilton streets, and an office at 27 North Eighth street.

The building at the north side of Twenty-fifth street, near Eleventh avenue, New York, which was formerly occupied by the Cornell foundry, is to be reconstructed to serve as a garage for the delivery wagons of the Wanamaker store.

The Reading Automobile Co., Reading, Pa., have commenced work on a new garage at Fifth, near Washington, directly across from the Orpheum Theatre. The building will be a three story structure of reinforced concrete, costing \$60,000. They expect to occupy it about January 15.

The Knox, which has heretofore been handled by John A. Boyd as agent at Indianapolis, will be looked after by the newly organized Conduitt Automobile Co. in that city. A building at 332 and 334 North Delaware street has been leased, and a salesroom and garage has been established. Mr.

Boyd will continue in an active capacity with the new company.

A galvanized iron garage is to be erected in Kern City, Cal., on I street, next to the Wells-Fargo Building.

Elmer Allen, Independence, Mo., has leased the skating rink building at South Main and Kansas street, and will fit it up as a garage.

Work has been started on a new garage for E. C. Barber, on Summit avenue, Summit, N. J. The building is to be finished before November 1.

Roby Moore, Ocean Park, Cal., has bought the "Auto Inn" Garage on Pier avenue, and will remodel and enlarge it. Mr. Moore has the agency for the Overland line.

The new garage of the Bayside Automobile Company, Flushing, N. Y., has been completed and opened for business. It is located on Broadway near Belle avenue.

The firm of Macer & Peterson, who conducted the Commercial Street Garage in Kewanee, Ill., has been dissolved, and the business will be continued by Wilbur H. Peterson.

Albert R. Shattuck and Geo. F. Chamberlin have let the contract for a twelve story light manufacturing and automobile building at 244-252 West Fifty-fourth street, New York city.

T. L. Patterson, Albany, Ga., has bought a building site at the corner of Plint street and the Court House alley, and intends to erect a garage building. The lot is 67x210 feet, and is centrally located.

The Maxwell-Briscoe Motor Co. has organized a branch sales company in Louisville, Ky., of which R. H. Edelan is president, Dr. F. S. Clark vice president and treasurer, and T. L. Marshall secretary and general manager.

The Myers Garage has recently been opened in Bushnell, Ill., on West Main street. The garage comprises a completely equipped repair shop, as well as a compressed air plant and other modern garage equipments. Frank Dill has charge of the mechanical department.

T. E. Smith, Salt Lake City, Utah, has bought the garage located in Post Office place, and is erecting a new fireproof building in State street, which will be ready for occupancy in about sixty days. The new building will be 76½x247 feet. It will comprise a repair shop and a supply salesroom.

The Imperial Motor Co. has been organized at Kansas City, Mo., by W. F. Turrell, president; Gail Reed, vice president and sales manager, and O. E. Dodge, Jr., secretary and treasurer. The company has purchased the Cowie electric garage at 3313-15 Troost avenue, and will handle the Woods electric.

The firm of Lovell & Hege, Clinton, Ia., has taken a five year lease on a new one and one-half story, 100x47 foot garage building that is being erected on Second street, between Third and Fourth avenues. The company has the agencies for the Regal and Haynes cars, and intends to also take on a low priced runabout.

The Lee Motor Car Co., of Los Angeles, Cal., has decided to establish a branch agency for the Cadillac car in Pasadena, under the management of L. G. Pattee. The company has bought a building site at the corner of Union street and Broadway, and will immediately erect a 100x140 feet brick and concrete garage, to cost about \$25,000, which will be completed about October 15.

The Central New York Automobile Co. has been organized at Oneonta, N. Y., with a capital stock of \$50,000, and has bought out the business of I. Van Ettem, who conducted the Oneonta Automobile Station on Dietz street. The new company has the agency for Buick cars. A new fire-proof garage building, three stories high, will be erected at a cost of \$25,000. Frank G. Anderson will act as general manager of the company.

The Henderson Automobile Co. has recently been organized in Vinton, Ia., with the following officers: D. L. Bryan, president; C. A. Kling, vice president; John Lorenz, treasurer; J. P. Whitney, secretary, and Chas. Henderson, manager. They have secured a two story building and reconstructed it as a garage. It has a capacity for fifty cars, and is fully equipped with an air compressor, wash rack and machine shop equipment. The

company intend to secure the agency for several lines of high class cars.

The Oakland Motor Car Co, have recently opened their Seattle, Wash., salesroom at 312 East Pike street.

Richard Patterson has retired from the agency and garage concern of Holloway & Patterson, Monroe, Wis., and Percy Holloway will continue the business.

The Krueger Auto Co., of Oshkosh, Wis., has reorganized under the name of the Oshkosh Motor Car Company. J. A. Crum is president and Frank Blum is secretary.

F. W. Vogler and Norman Devoe have recently taken the agency for Buick cars in Portland, Ore., and will cover the territory in Oregon, Washington and northern Idaho.

Chalenor & Saylor, formerly implement dealers, of Palouse, Wash., will hereafter give their attention to automobiles, and have recently received two carloads of machines.

Emanuel L. Phillipp, president of the Union Refrigerator Transit Co., of Milwaukee, Wis., is building a \$10,000 private garage near his residence on Hackett avenue, Milwaukee.

The Stoddard-Dayton agency in Seattle, Wash., will be located in the old Capitol Hill Garage at Nineteenth avenue and East Roy street. Ira D. Lundy is the manager for the Seattle house.

The Metropolitan Motor Car Co., Seattle, Wash.. is a new corporation, of which Bruce A. Griggs is manager and president. The concern will have the agency for the Acme and Pullman cars.

The Metropolitan Motor Car Co., of Seattle, Wash, plans to erect a one story concrete garage and auto salesroom in the Henry Building, adjoining the Olympic Motor Car Co. The new garage will be 70x100 feet.

Thomas A. King, a livery man of Louisville, Ky., has converted his livery stable at Second and Guthrie streets into a garage and entered the automobile business. He has the agency for the American car and the Alco truck.

The Shawano Auto Co., of Shawano, Wis., which recently rebuilt the Mehlhorn Building into a garage and salesroom, will erect a \$25,000 building next spring. It will be two stories high and have ample livery, repair and garage facilities.

James Menhall and Harry Vale, Beloit, Wis., have formed a partnership to handle the Overland and Marion cars in several counties in Wisconsin, including Madison and several other large cities. They will establish a number of subagencies.

M. S. Bringham, of the Bringham & Fenn Motor Car Co., Seattle, Wash., has bought out his partner, C. H. Fenn, and hereafter will have entire control of the company, of which he is president. Mr. Bringham has the agency for the Cadillac car for 1910.

F. A. Bennett, who has handled a number of makes of motor cars in Spokane, Seattle and Portland, intends to close up all of his Northwest stores except the one in Portland, where a part of his original line will be handled.

The Polson Implement Co. have entered the automobile field in Seattle, Wash., and have taken the agencies for the American and Maxwell lines. Marc Bunnell, who last season handled the Locomobile and Maxwell, has become interested in the Polson Implement Co., and will be manager of their automobile branch. The company will open their new garage and salesroom at 926 First avenue South on September 15.

The Hokanson Automobile Co., of Madison, Wis., the largest agency in the capital city and western Wisconsin, has reorganized under the same title, but with a capital stock of \$70,000, an increase The following officers were elected: of \$30,000. President, Charles F. Spooner; vice president. Emil Hokanson; treasurer, George P. Miller; secretary and general manager, Rudolph Hokanson. George P. Miller, of Madison, a former State Senator, will take an active interest in the affairs of the company. The garage and salesrooms on Doty street, Madison, will at once be enlarged and improved, two stories being added, and the company will begin the manufacture of tops and novelties. The company already has

several branch garages in southern and western Wisconsin, and this chain will be lengthened gradually.

Fred Ryan and Donald Jacobs, Riverside, Cal., have bought the San Jacinto Garage from W. D. Jacobs.

The Ortonville Auto and Supply Co., of Ortonville, Minn., will open a garage and salesroom for the E-M-F.

A garage is to be erected on a 100x100 foot plot at 535-541 West Forty-second street, New York city, which was recently sold.

The Keystone Automobile Co., Uniontown, Pa., is erecting a garage building on West Main street. I. W. Semans is at the head of the company.

George Kemp and Mr. Van Duell, Tarrytown, N. Y., have leased the old Hudson Valley Garage in Church street, and will conduct it as the Tarrytown Garage.

Edwin Kilburn, D. M. Peshak, W. E. Hutton and C. A. Gilbert, in Spring Valley, Minn., have organized the Spring Valley Automobile Co., to handle the Ford, Reo and Overland.

C. R. Patterson & Son, of Greenfield, Ohio, will soon begin the erection of a modern garage at that place. A representative of the concern has been sent to Columbus and Cincinnati to secure ideas for the new structure.

Work has been begun on a frame garage building for Carl Grau, Houston, Tex. The building will be located on the north side of City Hall square, fronting East Fifth street. Mr. Grau has the White agency.

Fred B. Henderson, Denver, Col., will build a garage on the site of the Metropole and Palace stables at Fifteenth and Cheyenne streets. It is reported that the Studebaker Automobile Co. has taken a long lease on the property.

J. E. Wyckliffe Goldsmith, Jr., and T. D. Meador, Jr., Atlanta, Ga., have secured a garage with salesroom and repair shop at 12 and 14 East Cain street. They have the agency for the Speedwell car and the Gramm-Logan truck.

The Love Garage Co., Columbus, Ohio, recently changed from a partnership to a corporation, will some be installed in a new structure on North High street which is being erected for the concern. The present location is West Fifth avenue.

The Colonial Motor Car Co., Springfield, Mo., will open a storeroom for new and second hand cars and for motor supplies in a building on St. Louis street. The company conducts a garage in Pickwick alley, off South Jefferson street.

The Studebaker and E-M-F agency in Columbus, Ohio, under the management of A. J. Pray, was informally opened September 6. The agency, which will not do a general garage business, is housed in a new structure 188x40 feet on North Fourth street.

Milton P. Stiles, of Ventura, Cal., is erecting a 52x100 foot two story brick garage on Main and Palm streets. The building will be in the Mission style of architecture, of pressed brick with large plate glass windows. The second floor will be used for office purposes.

D. L. Ormsby has sold the Audubon Garage and Machine Works, 415 West 150th street, New York, to E. L. Bush, who will continue it under the same name. Mr. Ormsby retains the agency for the Middleby car, and will devote all of his time to the sale of this machine.

The Hoffman-Moore Automobile Co., Lafayette, Ind., have opened a garage and salesroom on Main street, between Eighth and Ninth. The company is composed of Samuel C. Moore, president of a local trust company, and Archie Hoffman, an automobile mechanic.

The Imperial Motor Car Co. of Canada, a recently incorporated firm handling the General Motors Co.'s lines in the Dominion, will shortly erect a new garage and salesroom building on Church street, near Richmond. The company is temporarily located on King street, and has a showroom in the Transportation Building.

The recently organized Augusta (Ga.) Automobile Garage Co. has secured a building at 729 Broad street, which will be remodeled as a garage, and occupied about October 1. The officers of the company are C. B. Garrett, Chas. D. Carr and John J. Evans. The garage is to house the cars

of members of the Augusta Automobile Association.

J. G. Klemn, Philadelphia, Pa., has let the contract for a two story 24x150 foot garage at 115 North Broad street. The contract price is \$18,000. Fred E. Gilbert, Jacksonville, Fla., has moved

from East Bay street to his new building at Laura and Church streets. Mr. Gilbert conducts a general garage business.

C. W. Foy and A. M. Hawley, Pasadena, Cal., have formed a partnership under the firm name of the Crown City Auto Repair Co., and opened a repair shop at 161 West Colorado street. They will make a specialty of Maxwell cars, with which they are particularly familiar.

O. Werner, proprietor of the Golden State Garage, located at 2122 West Pico street, Los Angeles, Cal., will make extensive additions and practically double its present capacity. Mr. Werner has recently secured the agency for Palmer-Singer cars in addition to that for the Simplex, which he already held last year.

The new eight story building of the Pence Automobile Co., Minneapolis, Minn., has been completed and opened for business. The building contains a total of 102,000 feet of floor space, and is undoubtedly the largest structure occupied exclusively by an automobile concern in the West. We expect to give a detailed description of the building in an early issue.

The garage which is being erected by J. L. Horning and John S. Hill at Fifth and Fir streets, San Diego, Cal., will shortly be completed. It will be one of the largest garages in Southern California, measuring 100x100 feet, the building comprising a 25x50 foot repair shop and a 20x40 foot showroom. It will accommodate at least seventy-five automobiles, and there are no obstructions of any kind in the main storage room.

The Corker Motor Car Co. has been organized at Atlanta, Ga., with the following officers: S. A. Corker, president; E. H. Ellerby, secretary and treasurer, and M. Z. L. Fuller, manager of out of town sales. The company, which has acquired the agencies for the Haynes and Matheson cars, is at present looking for suitable quarters. It will handle the Haynes in the States of Georgia, Florida, Tennessee, Alabama and North and South Carolina.

### New Incorporations.

Cortland Carriage and Motor Co., Philadelphia, Pa.—Capital, \$26,000.

John W. Brown Manufacturing Co., Columbus, Ohio.—Capital increased from \$75,000 to \$125,000. The Elkhart Motor Car Co., Elkhart, Ind.—Capital stock, \$200,000. W. W. Stirling is president.

Lloyd Automobile Co., Portland, Ore.—Capital stock, \$40,000. Incorporators, W. E. Cook, C. B. Lloyd and L. Templeton.

Racine Boat and Auto Co., Seattle, Wash.—Capital stock, \$30,000. Incorporators, C. W. Chandler and F. N. Mitchell.

Elmore Motor Car Co., Los Angeles, Cal. Capital stock, \$75,000. Incorporators, E. B. Smith, D. B. Rose and Clarence F. Smith.

The Worth Motor Car Manufacturing Co., Kankakee, Ill., has filed notice of an increase in capital stock from \$25,000 to \$100,000.

Western Garage, San Francisco, Cal.—Capital stock, \$10,000. Incorporators, J. E. Coombs, H. P. B. Carden and W. E. Humphreys.

The Consolidated Motor Co., Bridgeport, Conn.—Capital stock, \$5,000. S. T. Valic, president and treasurer, and E. K. Roberts, Jr., treasurer.

Hodge-Pemberton Auto Co., Fort Worth, Tex.— Capital stock, \$10,000. Incorporators, J. T. Pemberton, C. T. Hodge, B. H. Martin and others.

The Badger Auto Co., Oshkosh, Wis.—Capital stock, \$50,000. Incorporators, M. L. Cotrill, L. J. Monahan, J. D. Termaat and E. H. Fahrney.

Hinton Automobile and Supply Co., Hinton, W. Va.—Capital stock, \$2,000. Incorporators, C. C. Coalter, John Leslie, C. W. Duroin, W. H. Garnett and W. L. Fredeking.

Beverly Garage. Staunton, Va.—Capital stock. \$25,000. Incorporators, M. W. Mercereau, president; L. A. Beck, secretary and treasurer; J. S. Pancake, John H. Bowman, C. P. Bowman and L. S. Bowman.

L. S. Bowman.
The Viking Co., Kittery, Me.—Capital stock,
\$10,000.
Incorporators, H. Mitchell, president;
\$1.
J. Morrison, treasurer.

Automobile Sales and Supply Co., San Antonio, Fex.—Capital stock, \$20,000. Incorporators, Sidney H. Weis, E. A. Kalkhurst and Rover Campbell.

The Conduitt Automobile Co., Indianapolis,

Ind.—Capital stock, \$10,000. Incorporators, Wm. A. Conduitt, John A. Boyd and A. J. Cochran. Auto Spring Repairer Co., New York City.—

Capital stock, \$20,000. Incorporators, Julian M. Pinkney, Wm. R. Petze and Francis M. Pinkney. The Dayton Auto Top Co., Dayton, Ohio.—Capital stock, \$10,000. Incorporators, J. B. Kline J. P. Jeskson, Chee T. Cavilla Lorenth

Kline, J. P. Jackson, Chas. T. Cutlip, Jeremiah C. Chase and D. G. Harmen.
Eddy-Sherwood Carriage and Motor Co., Bridgeport, Conn.—Capital stock, \$5,000. Incorporators, Henry M. Sherwood, Fairfield; Geo. E. Eddy, Bridgeport, and Geo. S. Jennings, of Southport.

The Auburn Motor Garage Co., Milwaukee, Wis.—Capital stock, \$6,000. Incorporators, Harry F. Melius, Chas. G. E. Weinert and Jacob Melius, Jr., to handle the Auburn and operate a garage.

#### Trade Personals.

Wm. T. White has been appointed general manager of the Mercer Automobile Co., Trenton, N. J. William L. Scribner, formerly of the E. R. Thomas Motor Co., Buffalo, has joined the engineering department of the R. L. Morgan Co., Worcester, Mass.

J. B. Sperry, formerly of Cleveland, Ohio, has become sales manager of the Motor Car Co., of Washington, D. C., who handle the Chalmers-Detroit car in the District of Columbia.

David C. Herstine, formerly superintendent of the repair department of the Automobile Club of America, has taken the position of head instructor of the Stewart Automobile Academy of New York.

L. B. Hubbell, formerly head of the engineering department of the Pope Manufacturing Co., Hartford, Conn., has assumed the position of chief designer for the Matheson Motor Car Co., Wilkes-Barre, Pa.

We are informed that Conrad A. Dieterich, who specializes in patents and patent litigation affecting the automobile and allied industries, has retired from the firm of Straley & Hasbrouck, and has removed his office from 257 Broadway to 45 Broadway, New York city.

Wilhelm Opel, the head of the firm of Adam Opel, of Russelsheim, Germany, and Mra. Opel arrived in this country last week on the steamer Kaiserin Auguste Victoria for a six weeks' trip through the United States. Mr. Opel was the winner of this year's Prince Henry Tour.

Walter Cather, formerly purchasing agent for the Auto Vehicle Co., Los Angeles, Cal., has resigned his position with that company to engage in the manufacture of wind shields, as a member of the firm of Parish & Cather, which is located at 201 East Seventh street, Los Angeles, Cal., and manufactures the Tabor wind shield.

James C. Howell, of New York, has been appointed assistant manager of the Warner Instrument Co., of Beloit, Wis., to succeed Alfred S. Koto, resigned. Mr. Howell is a graduate of Columbia University, '94, and Columbia Law School, '99, and for two years has been in business as building contractor at Cornwall-on-the-Hudson.

New Agencies.

Boston, Mass.—W. L. Russell, Apperson.
Los Angeles, Cal.—R. C. Hamlin, Franklin.
Ortonville, Minn.—Colton & Ostlind, E-M-F.
Louisville, Ky.—Longest Brothers, Overland.
Minneapolis, Minn.—L. H. Fawkes, Marmon.

Atlanta, Ga.—Albert Dunn & Son, for the State of Georgia, Stearns.

Antigo, Wis.—The John Hessel Hardware Co., Maxwell.

Fort Pierre, S. Dak.—Douglas & McCready. Overland.

Stevens Point, Wis.—J. N. Welsby, for Portage, Marathon, Wood and Waupauca counties, Wis., Kisselkar.

# Selden Patent Sustained.

Judge Hough, of the United States Circuit Court of New York, on Wednesday, September 15, handed down a decision upholding the Selden patent in the case of the Electric Vehicle Company and George B. Selden vs. the Ford Motor Company, C. A. Duerr & Co., the O. J. Gude Company, John Wanamaker and others, and also in the suit of the same complainants against the Panhard & Levassor Company, Andre Massenat and Henry and A. C. Neubauer. These suits have been pending since 1903 and 1904, respectively. Judge Hough holds that the first claim of the Selden patent is the most important, and that both defendants are infringing it. The Selden patent expires in 1912, and has therefore three more years to run. It is very likely that an appeal will be taken by the defendants to the Circuit Court of Appeals. The complete decision and a review of the very important case will appear in our next issue.

In connection with the decision Mr. Ford, of the Ford Motor Company, one of the defendants, wishes to state that this is only the first decision in the lowest court, and that, of course, the case will be appealed to the higher court. It will be fought to a finish. It will be a matter of a few years before the final settlement of the case.

# MOTOR VEHICLE PATENTS

# Reviews of Specifications.

925,528. Pneumatic Brake for Motor Vehicles.—Ernest E. Sweet, of Detroit, Mich., assignor to Cadillac Motor Car Company, of Detroit, Mich. June 22, 1909; filed January 11, 1908.

According to this invention, the motor is used for braking the car by suitably altering the action of the valve gear. The motor employed is of the type in which both the inlet and exhaust cams are carried by the same cam shaft. The latter is arranged so as to be slidable lengthwise and is connected by means of a sliding coupling and link connection to a foot lever convenient to the driver. The inlet valve cam is of the usual construction, but the exhaust valve cam is of stepped construction, comprising four separate steps of different sections. When the motor is operating under normal conditions the inlet valve cam is located underneath the inlet valve push rod, and the section zz of the exhaust valve cam is underneath the exhaust valve push rod. If it is desired to have the motor act as a brake, the cam shaft is shifted in

the direction of its axis, whereby the inlet cam is moved from underneath the inlet valve so it will no longer open that valve, and at the same time section yy of the exhaust valve, which is shown in cross section in Fig. 3, is brought underneath the exhaust valve. The effect of this adjustment is that the engine acts as the dashpot during a portion of what would correspond to the suction and the compression strokes in normal operation. A further motion of the cam shaft brings the section xx of the exhaust cam underneath the exhaust valve. The engine will then operate as a dash-pot during the entire suction and compression stroke, but not during what would correspond to the power and exhaust strokes in normal operation. A still further motion of the cam shaft brings the section ww of the exhaustcam in line with the exhaust valve, and the engine then acts as a dash-pot all the time. Thus the braking effect of the motor is increased stepwise.

925,543. Vehicle Brake.—Joseph H. Wesson, of Springfield, Mass. June 22, 1909; filed June 30, 1908.

This invention relates to a construction whereby an internal expanding brake and an external contracting brake both act on the same drum secured to the rear wheel hub. To the housing of the rear axle is secured a stationary disc with peripheral

projections at diametrically opposite points. Into one of these projections is secured a stud parallel with the axis of the rear axle on which the two halves of the external contracting brake bands are pivoted. The free ends of these brake bands are provided with outwardly extending lugs, and to the outer faces of these lugs are secured hardened steel face cams. A stud or pin extends through these lugs and the cams, and bars are passed through slots in this stud just outside the face cams.

The internal brake construction consists of a number of blocks moving in guides secured to the axle housing. These blocks

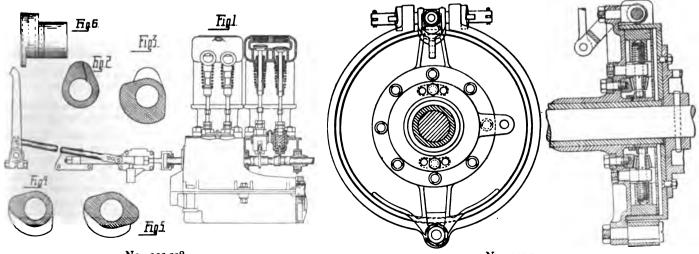


No. 925,937.

are provided with internal screw threads and have studs screwed into them which carry small bevel pinions on their inner ends. These bevel pinions mesh with a bevel gear crown which connects with a ring on the outer side of the stationary disc which encloses the internal brake mechanism. This outer ring is provided with a lever arm and may be moved through a certain angle around its axis, whereby the bevel pinions are rotated and the brake blocks are forced inward or outward, according to the direction of motion.

925,937. Elastic Vehicle Tire.—Charles Motz, of Akron, Ohio. June 22, 1909; filed July 31, 1908.

This tire is of the clincher type and of so called bridged construction. The tread of the tire consists of laterally extending portions between which there is a depression. The lateral extensions arch outwardly, which permits to spread them widely to form a very wide tire, giving a large gripping surface; but in order to further increase their gripping effect cross webs or bridging pieces are located at in-



No. 925,528.

No. 925,543.

tervals within the depression on the tread. As another means of increasing the gripping effect, the tread of the tire is provided with peripheral bead sections formed integral with the tire, the beads on one tread portion being opposite the space between beads on the other tread portion. The beads are semi-cylindrical in cross section and are formed integral with the tire. In order to increase the resiliency of the tire, the laterally extending portions are undercut, and the extensions are supported by inclined webs. Under pressure these webs bend and flatten, and they may be made sufficiently thick to insure strength without destroying their resilient effect. It is stated that it has been found that by inclining the webs the disintegration of the rubber is to a great degree eliminated, and a greater length of flexibility is secured.

926,330. Electric Ignition Device.—Theodore Hubert, assignor to Charles F. Splitdorf, New York, N. Y. June 29, 1909.

The novel feature of this device is the means for advancing and retarding the spark. The armature shaft is provided with a spiral groove in which a pin or projection attached to the sleeve 26 is adapted to slide. Collar 35 is the driving means, receiving a rotary motion from the engine, and having internal grooves engaging projections (not shown) in sleeve 26, which transmit rotary motion while permitting a longitudinal or axial motion of the sleeve. The adjusting arm 27 carries pins 31, projecting into oblique slots in a stationary sleeve attached to the magneto frame. Any



No. 926,330.

rocking motion of the arm produces, through the action of these pins and slots, a longitudinal motion of the arm which is communicated through the annular ball bearing to sleeve 26, the inward projections of which, in turn, cause a partial rotation of the armature shaft with relation to the collar 35, with a corresponding alteration in the time at which the spark occurs.

# Patents Issued August 3, 1909.

929,656. Muffler.-Andrew S. Coles, Mamaroneck, N. Y. Filed December 3, 1908.

929,762. Anti-Friction Bearing.—Henry Hess, Wawa, Pa. Filed November 30, 1908.

929,769. Internal Combustion Engine,-Joseph J. Kulage, St. Louis, Mo. Filed January 30, 1908. 929,794. Motor Vehicle.-Joseph K. Sharpe,

Jr., and Charles N. Leonard, Indianapolis, Ind.

Filed August 17, 1908. Anti-skidding device. 929,796. Reversing Gear.—Russell N. Smith, Wis. Filed June 12, 1908. Valve gear.

929,803. Dynamometer.-Ernest E. Sweet, Detroit, Mich., assignor to Cadillac Motor Car Co., Detroit, Mich., a corporation of Michigan. Filed November 12, 1908. Hydraulic.

929,829. Internal Combustion Engine.—Walter Burnell, Weston-super-Mare, England. Filed January 26, 1909. Two cycle, separate pump.

929,851. Anti-friction Bearing.—Henry Hess, Wawa, Pa. Filed November 20, 1902

029,884. Differential Gearing and Reversing Mechanism therefor .- David E. Ross, Brookston, Ind., assignor to Ross Gear and Tool Co., La Fayette, Ind., a corporation of Indiana. April 13, 1906.

929.886. Means for Mounting Valves in Engine Cylinders.-Louis G. Sabathé, Paris, France. Filed June 10, 1908.

929,905. Tire Tool .- Arthur C. Webber, Marrickville, Sydney, New South Wales, Australia. 929,944. Combined Muffler Cut-Out and Horn Valve.-Charles G. Hawley and Erle K. Baker. Chicago, Ill. Filed October 16, 1908.

929,970. Fuel Pump.-Norman McCarty, dianapolis, Ind., assignor to Atlas Engine Works, Indianapolis, Ind., a corporation of Indiana. Filed February 4, 1909.

929,997. Speed Changing Mechanism.—Robert Symmonds, Kenosha, Wis., assignor to Thomas B. Jeffery, Kenosha, Wis. Filed April 9, 1904. Filed April 9, 1904. Jeffery, Kenosha. Planetary.

930,056. Combustion Motor.—Giovanni Enrico, Turin, Italy, assignor, by meane about F. I. A. T. Co. Valves in head.
930,061. Vehicle Seat.—Edward H. Faile, New York, N. Y. Filed December 3, 1908.
Flectric Storage Battery.—Bruce

930,065. Electric Storage Battery.—Bruce Ford, Philadelphia, Pa. Filed September 7, 1906. 930,111. Vehicle Wheel.—Jeremy C. Willmon, Los Angeles, Cal. Filed March 11, 1908. Spring

930,196. Timer.-Alvaro S. Krotz, Chicago, Ill. Filed February 28, 1907.

930,273. Tire Inflation Mechanism.-Frederick A. Deunert, Kyabram, Victoria, Australia. Filed October 23, 1008. Pump permanently attached to

## Patents Issued August 17, 1909.

931,048. Spring Wheel.—Ludwig Flum, Chicago, Ill. Filed June 26, 1908.

Pneumatic Tire Plug.-Joseph Glanz, Hartford, Conn. Filed January 9, 1909.

931,065. Electrical Interrupter for Explosive Engines.—Gottlob Honold, Stuttgart, Germany. Filed December 18, 1905.

931,066. Electromagnetic Igniter for Explosion Engines.-Gootlob Honold, Stuttgart, Germany. Filed August 7, 1906.

931,082. Process of Preparing Alkaline Electrolytes for Storage Batteries .- David P. Perry, Chicago, Ill. Filed December 26, 1903. March 18, 1908.

31,106. Upholstering Attachment.—Halward Westmore, Milwaukee, Wis., assignor to A. 931,106. O. Smith Co., Milwaukee, Wis., a corporation of Wisconsin. Filed August 3, 1907.

931,120. Process of Extracting Rubber Like Gum from Its Vegetable Sources.—Felix H. Hunicke, Roselle, N. J., assignor to Continental Rubber Co., a corporation of New Jersey. Filed April 6, 1906. Renewed January 15, 1909.

931,176. Explosive Engine.—William F. Beaton, Frankford, Pa. Filed September 2, 1904. 931,207. Making Casings for Pneumatic Vehicle Tires.—John O. King, Milwaukee, Wis., assignor to King Leather Tire Co., Milwaukee, Wis.

Filed August 1, 1907.
931,214. Vehicle Wheel.—Barrett C. Oblinger, Independence, Mo., assignor of one-half to Albert H. C. Beatty, Independence, Mo. Filed April 3,

931,241. Spring Wheel.—Warren H. Wildrick, Phillipsburg, N. J. Filed October 5, 1908. 931,284. Anti-Skidding Device for Tires.—

Thomas I. Duffy, Chicago, Ill. Filed April 20, 1908.

931,288. Change Speed Gear.—Powell Evans, Philadelphia, Pa. Filed March 6, 1907. 931,289. Change Speed Gear.—Powell Evans,

Philadelphia, Pa. Filed November 2, 1907. 931,319. Gas Engine.—Alvaro S. Krotz, Chicago, Ill. Filed February 28, 1907.

931,346. Internal Combustion Engine.-Enk A. Rundlöf, Stocksund, Sweden. Filed August **28**, 1908.

931,386. Carburetor.-Monroe D. Colbath. Hampden, Me. Filed July 31, 1908.

Automobile Wheel.—James A. Flem-931,403. ing, Danville, Ill. Filed September 22, 1908.

931,451. Rear Axle for Automobiles.-Frederick C. Miller, Cincinnati, Ohio. Filed March 19, 1907.
931,505. Vehicle Wheel.—Clarence L. Shaw,
Casa Grande, Ariz. Filed July 10, 1907.

Process for Manufacturing Elastic 931,563. Tires for Wheels .- Tito L. Carbone, Charlottenburg, Germany. Filed July 22, 1908.

Vehicle Wheel.-Thomas B. Jeffery. 931,615. Vehicle Wheel.—Thoma Kenosha, Wis. Filed April 1, 1907.

931,648. Inner Tube of Pneumatic Tires. Harry K. Raymond, Akron, Ohio, assignor to the B. F. Goodrich Co., Akron, Ohio, a corporation of

Ohio. Filed April 16, 1909. 931,684. Automobile Lock.—Henry F. Crim and William C. Loy, Rochester, Ind. Filed June 27, 1908.

# Patents Issued August 31, 1909.

932,463. Rotary Internal Combustion Engine.-Frederick W. Goyette, Los Angeles, Cal. Filed July 26, 1907.

932,465. Carburetor.—Cyrus A. Louis, Mo. Filed November 30, 1908. Carburetor.-Cyrus A. Hass. St.

Vehicle Spring Structure.—Jasper P. 932.489. Murrey, Cleveland, Ohio. Filed January 8, 1908. 932,546. Motorcycle Frame.—Carl O. Hedstrom.

Springfield, Mass. Filed April 2, 1909. 932,551. Road Vehicle.—John Hopper, Fulham. England. Filed February 29, 1908.

932,611. Changeable Speed Gearing.—Edward A. Johnston, Akron, Ohio. Filed November 30, 1908.

932,723. Muffler for Explosive Engines.-Dewane B. Smith, Deerfield, N. Y. Filed July 27,

735. Starting Device for Automobile and Engines.—Arthur G. Willard, Bakersfield, 932,735. Cal. Filed July 13, 1906.

932,814. Change Speed Gearing.-Louis A. Saussard, Paris, France. Filed July 31, 1908.
932,815. Casing for Pneumatic Tires.—James Seiberling, Jonesboro, Ind. Filed March 3,

932,825. Indicator.—Charles W. Snyder, Hudson, N. Y. Filed March 17, 1909.

932,841. Battery Covering.—George E. Andrews, Providence, R. I. Filed May 21, 1909.
932,843. Variable Speed Power Transmission.— Louis G. Bayrer, Hartford, Conn. Filed January

Carburetor for Internal Combustion 932.860. Engines.—Philippe J. Grouvelle and Emile H. Arquembourg, Paris, France. Filed June 7, 1906. 932,862. Vehicle Wheel.-William L. Howard.

Trenton, N. J. Filed January 7, 1909.

032.876. Detachable Rim for Pneumatic or Tires .-- Marcel A. Lemercier, Paris, France.

Filed February 2, 1906.
932,885. Speed Gauge.—Orson D. Munn and John K. Brachvogel, New York, N. Y. Filed

March 25, 1907. 922,969. Spare Wheel for Motor Cars and the Like.-Frederick R. Dennison, Oamaru, New Zea-

land. Filed May 13, 1908. 932,976. Resilient Wheel.—John Edman, Min-

neapolis, Minn. Filed February 21, 1908. 933,007. Automobile Carriage.—Thomas J. Van Pelt, State Center, Ia. Filed June 19, 1908.

The Portland (Ore.) Chauffeurs' Association has recently been formed to "protect its members from imposition from the public, as well as to keep out the riff-raff of the driver's profession."

# The Horseless Age

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# Dependence of Tire Life on Wheel Diameter and Cross Section.

BY ALBERT L. CLOUGH.

It is pretty well admitted upon all sides that there is a decided economic advantage in the use of pneumatic tires of larger cross section than that which is barely necessary to carry the weight of a car without frequent blowouts. That is, that if a 4 inch tire can be used to support so many hundred pounds of car weight, and come within the recommendations of the tire makers, a 41/2 inch tire can be employed with even greater ultimate advantage, for the larger tire, although costing more initially, may be expected to afford so much additional mileage as to reduce the tire bill per mile to a lower figure than that obtainable with the smaller one.

Another belief which is widely held is that, assuming two tires of the same cross section, say 4 inches, one of them 30 inches in diameter and the other 36 inches in diameter, the latter is the better proposition economically, assuming that both are used under cars of equal weight, horse power and speed, with suitable differences in their driving gear ratio.

The writer knows very little, indeed, about the tire problem, and does not remember ever seeing any figures published giving a concrete idea of how two such cases as the above figure out from the economic standpoint. This little communication is written in a spirit of inquiry, in the hope that it may bring out some pertinent information from the tire makers, from car manufacturers or from users. As far as the average motorist is concerned, the answer to the question as to whether the large diameter tire is cheaper in the end than the small diameter tire of equal cross section, conditions of use being the same, is almost entirely a matter of opinion, unsupported by accessible data.

## LARGER WHEEL DIAMETERS.

It would be interesting to know what bearing, if any, the following considerations have upon the question: Take the case of two cars, otherwise of the same model, one equipped with 30 inch wheels and 4 inch tires, and geared 3 to 1, and the other fitted with 36 inch wheels and 4 inch tires, and geared 3.6 to 1. These two cars should possess the same speed and hill climbing power. Under these

conditions the tractive effort exerted upon the road by each tire is obviously the same, and each section, as it becomes the point of contact, is equally stressed. In the case of the 36 inch tires, however, each section is thus stressed only 5/6 as frequently as in the case of the 30 inch tire, at the same car speed. In so far as this oft repeated stress upon the structure of the shoe tends to disrupt it, it would seem that the larger tire should have the advantage in point of length of life.

If the two cars possess equally powerful brakes, the stresses in the tires due to brake application are of equal severity in both cases. Exactly as in the case of driving stresses, the frequency with which any one section of the casing is stressed, in retarding the car, is only 5/6 as great in the case of the larger as in that of the smaller tire. Has anyone any data as to the practical effect of these different rates of repetition of these stresses?

### SLIPPING.

The attrition between the road and the tire, tending to wear away the tread, is distributed over 6/5 as much surface in the case of the larger tire as in the case of the smaller one, the presures and sliding stresses being roughly the same in the two cases. The larger tire has a larger area of contact with the road than the smaller one, however. Does this make any difference in the rate of slip in favor of the larger tire? If so, is there any difference in the rate of wear of its tread due to this cause? It is frequently assumed that, between surfaces of the same materials, equally loaded, friction is independent of the area of the contact surfaces. Is this rule true when applied to tires?

If the rate at which the materials of the shoe are fatigued by the driving and braking stresses imposed upon them, and also the rate at which the tread is worn down are, as they would appear to be, 5/6 as rapid in the case of the larger tire as in that of the smaller, this is only another way of saying that these rates of failure are inversely as the amount of material in the two sizes of tire, the cross sections being equally heavy in both instances.

It is understood, however, to be the practice with many tire makers to employ additional layers in the building up of the 36x4 inch tire section as compared with those used in fabricating the 30x4 section, and that there is also some additional rubber in the 36x4 tread. Certain makers, on the contrary, seem to use identical sections for all tires of the same cross section, irrespective of wheel diameter.

## EFFECTS OF ROAD IRREGULARITIES.

Considering the effect of road irregularities upon these two tires, it is evident that, in absorbing a rock or other obstruction upon the roadbed, the wall of the large diameter tire is required to flex less abruptly than the wall of the smaller one. The question as to how much, if any, significance this fact has as tending toward a longer period of service in the case of the larger tire is an interesting one, and one probably incapable of prediction on a priori grounds, but requiring experimental demonstration.

Road shocks due to the wheels dropping into road depressions or climbing abrupt water bars are admittedly less in the case of larger than that of smaller wheels. Assuming springs of equal efficiency on the two cars which we have been considering, and admitting that the oft repeated action of pneumatic tires in absorbing road shocks is one of the most important, if not the most important, causes of their ultimate failure, what effect may a difference in diameter between 36 and 30 inches have in the life of the two sizes of tires here taken as examples?

## RESILIENCE OF WOOD WHEELS.

Another question may be worth the asking. Does the resilience of the wood wheel itself act in an appreciable degree to mitigate the severity of the shocks borne by tires? If so, is the 36 inch wheel, with its longer spokes, an appreciably more efficient aid in "buffing" the shocks than the 30 inch wheel, and thus a factor in the direction of longer tire life? It may be that this is a question worth considering in connection with dished spokes, but not with the ordinary form of wheel.

Referring to a 1910 price list of tires one finds the 36x4 tire and tube listing for 21.7 per cent, more than the 30x4, while the diameter of the 36 inch tire is exactly 20 per cent, greater than the 30 inch.

The prices are thus very nearly in proportion to the diameters, and the economic advantage of the larger tire, if there be any, may be found in the extra heavy cross section and tread sometimes embodied in the larger diameter tire, in its less susceptibility to damage by shocks due to road irregularities, and the greater ease with which it absorbs rocks and other objects. The writer would very much like to know whether practice demonstrates any such advantage to exist, and the magnitude of it.

#### OPTIONS PUZZLING.

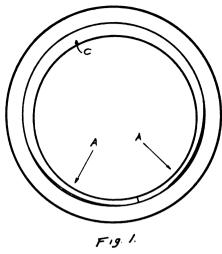
This question was brought up recently by a party who was contemplating buying a chassis from a manufacturer who offered an option in regard to wheel diameters, including the 32, 34 and 36 inch sizes. After discussing easy riding qualities, centre of gravity and so forth, the query arose as to which size would afford lowest tire maintenance cost. No reliable data could be obtained at the time to settle this point. As there are probably other readers who have had the same question come up in their experience, the matter is brought up here in the hope that some light may be shed upon it.

Referring to the point touched upon in the first paragraph of this article—that of the economic value of tire sections with a large factor of safety as regards weight carrying capacity—it is probable that definite figures from users who have employed tires of different section upon the same car at different times, as to the magnitude of the advantage gained by using the larger ones, would be very welcome, as no published figures upon this subject are recollected.

# Piston Packing Rings. By R. M. A.

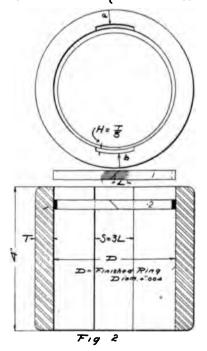
So far as the machine shop can lessen the cost both of hand labor and of a "running in" of bearing parts, it is not only reasonable but economical to do so. This preliminary leveling of high spots and a consequent longer life to the motor without adjustment is a live issue today. Yet at present some manufacturers are relying upon hand labor for a large part of the fine fitting that can be disposed of in the machine end. Pistons and their rings are still being filed after leaving the grinder, thus destroying a good surface and increasing expense.

It has long been noted that the points of the piston packing rings project with sufficient force to prevent the immediate vicinity back of these points from bearing. This is so marked that with a ring, as it is finished in many shops, held in a standard gauge bushing, this lack of bearing allows light to pass through (see Fig. 1, AA). This space allows compression to leak by, as well as oil to waste. Placing two similar engines side by side, with a maximum oil level in the crank case of engine A, having



tight, well fitting rings, and a minimum level in engine B, with poorly fitting rings, it was difficult to cause A to smoke as much as B. A had stiff rings that fitted well from the first; with B the case was the very opposite. It was also noted on all engines of type A that the road testers wondered at this apparent lack of oil, having become accustomed to its prevalence at the exhaust pipes of the B type. In general, no hand filing was done or found necessary after the proper manner was found for machining the rings of A.

If in Fig. 1 the points of the ring C bear so hard as to sacrifice part of the bearing surface, it is logical to reduce these high spots, as previously done with a file. To do this in the lathe was even simpler. It is the general practice to house the rings in a hardened bushing preparatory to clamping them on the flanged arbor for the final cut. This bushing, however, was simply relieved by cutting two channels diametrically opposite, and the rings were placed in as before, but alternating their relation, the gap of ring No. 1 coming directly over the heavy part of No. 2, and all points opposite



either one channel or the other. Fig. 2 shows this plainly. The rings, on being clamped on the flanged arbor, with the bushing removed, have their points perceptibly projecting beyond the adjacent rings, such that in cutting the tool removes proportionately more metal at these points. The strength of metal here is now sufficiently reduced so that the ring as a whole has a more uniform bearing. For average practice the width of channel S=3L, where L is the average length of the high spot (see L, Fig. 2). The length L should preferably be taken from a regular old style shop ring after same has been run in a regular test before shipping. The depth of the channel

S is taken as  $H = \frac{T}{5}$ , where T is the thick-

ness of the steel bushing, which latter should be at least one-half inch. To space the ring points equally over the channel S two fine file marks are cut at a and b so that when the ring is flush in the bushing the upper edge of the gap is in line with its respective mark. In filling the bushing with rings care should be taken to give them a motion parallel to the axis of the bushing, as any twisting will tend to dislocate the ring.

With a more perfect bearing of the ring assured the "stiffness" of the same rings can be reconsidered. There being no theoretical compression radially, the strength of the ring is unaffected by either compression or explosion. When we consider the very light springs used on large steam cylinders to keep the ring bearing, it seems true that many of the present designers have made the gas engine ring stiff in order to insure its wearing in properly. An instance of rings that were too severe is very interesting and baffled the designers at first.

Three very stiff rings were used all at the top of the piston. The men complained of their difficulty in pushing the piston up into the cylinder. This was the first real notice we had. On examining the cylinder after a short run it was found that all traces of the grinder had been removed in the path of the rings only. A few cars were shipped with these rings, and it was not long before customers complained of a peculiar knock in the motor. After trying all past remedies (of course not as yet knowing the cause) with no results, the motors were torn down. Ridges were found in the cylinders corresponding exactly to the path of the rings, but on the opposite side from the thrust of the piston. New cylinders being tried, the trouble disappeared, and, having substituted lighter rings, the trouble has not recurred. The interesting part of this is that the perceptible wear was on the opposite wall from the thrust. This can be explained only by the fact that the thrust caused the piston and the rings to bear or the wall, while on the opposite wall the rings projected a distance equal to the clearance of the piston diameter and cylinder such that the rings acted like cutters and "pulled down" this wall.

# Heat Distribution in Auto Engines. By F. E. WATTS.

The article on page 231 of the issue of September 1, entitled "Fuel Economy and Its Dependence on Engine Design," sets forth in an admirable way many of the conditions which must be met to secure economical operation. The advantages to be secured by making the walls of the compression space of as small area as possible in relation to its volume are, however, perhans overemphasized for automobile work. Probably there is less heat lost from an engine with a nearly globular compression space than from one having any other form; but the difference is not great enough to warrant the importance usually given to the matter in text books, at least not for small engines making a large number of revolutions per minute. When I first began work on stationary engines I believed in long stroke engines for this very reason, but was never able to definitely trace any increased economy to the use of a long stroke. The long stroke engines wore better and ran more quietly as a general rule. but were not markedly more economical of fuel.

The only really important reason why a long stroke motor should be more economical than a short stroke one, aside from frictional considerations, is that the charge is retained in the cylinder longer, and hence each particle is liable to be more completely burned. There is probably little difference in the heat lost through the cylinder walls, no matter what the ratio of bore and stroke, at least for small engines.

Let us consider two engines, A with bore and stroke of 4 inches each, B with a bore of 4 inches and a stroke of 8 inches. Their data might be as follows:

	A.	В.
Piston displacement	50 cu. in.	100 cu. in.
Revolutions for 1,000		
feet, piston speed	1,500 r. p. m.	750 r. p. m.
Compression space	15 cu. in.	30 cu. in.
Time of stroke	0.02 sec.	0.04 Sec.
Expansion ratio	Same in	both.
Expansion rate	2	1

This table shows that there will be little difference in the heat losses in the two engines. B takes in twice as much gas as A, and handles it in a chamber which has less wall area per unit of charge than A, but it handles each unit slower, expands it for a longer time, and hence exposes each unit to the walls for a longer time.

As was stated in the article before referred to, the cylinder temperatures and pressures fall rapidly after the charge begins to expand, and hence the heat loss to the walls is greatest at the beginning of each stroke when the exposed surface consists of the walls of the compression space, the piston head and the upper part of the cylinder bore. But the diagrams for the heat transferred to the walls and for the heat transferred from the walls to the water jacket could they be drawn, as they no doubt will be in the near future, are not at all like the diagram for the heat inside the cylinder. The heat loss to the walls

no doubt varies greatly in different parts of the cylinder with different methods of applying the cooling agent and with various arrangements of the valves. Convection of the gases and heat transfer from the piston are the two important factors which tend to equalize the cylinder temperature and heat losses per unit from the top downward.

This is admirably shown for a small motor by the experiments of Prof. H. L. Callender, which were described in THE HORSE-LESS AGE of May 18, 1904. The motor was a Clement Garrard cycle motor, with a single vertical, air cooled cylinder. The bore was 2.4 inches and the stroke 2.8 inches. Circumferential ribs were used for cooling, as shown in the sketch. The compression was 68 pounds at 730 r. p. m. with full throttle, and 33 pounds at 1,160 r. p. m. with

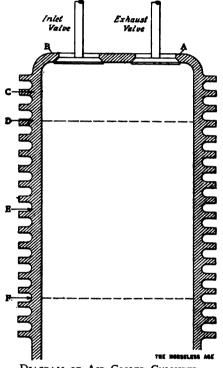


DIAGRAM OF AIR COOLED CYLINDER.

small throttle. Temperatures of the cylinder walls were measured at various points by means of thermo couples screwed into small holes in the walls.

When the motor was run on the block the temperature near the exhaust valve, as at A, rose to 570° C. So a centrifugal fan was mounted on the flywheel so as to deliver air horizontally across the head. A second fan was arranged to deliver air horizontally against the side of the cylinder. When only the first fan was used the temperature at A rose to about 400° C. With both fans it rose to about 300° C. At B it rarely rose above 70° C. On the walls of the combustion chamber, as at C, it was from 200° to 260° C. Tests at D, E and F showed a drop of only about 20° C. in the length of the stroke. That is, when the temperature was 200° C. at D it was 180° C. at F. Furthermore, it was found that retarding the spark raised the temperature

of the head and lowered that of the barrel.

The manner of cooling this motor was not favorable to the transfer of heat downward, but evidently on account of its high speed, 2,000 r. p. m. in some cases, the piston carried heat enough to the lower end of the cylinder so that the heat lost per wall unit there must have been quite large, as compared with that through the walls of the compression space. Very likely in slower running, water cooled automobile engines the piston convection is less, but it has been shown to be considerable even in large stationary engines.

For these reasons I believe that while the shape of the combustion chamber is of importance, it has less influence on engine economy than is generally thought. And while valves in the head, cylindrical or globular compression spaces, and long strokes have their advantages, they are not important enough to warrant their preference over other forms of construction. They aid in more thoroughly scavenging the cylinders and in taking advantage of gas inertia, and these advantages will probably eventually be considered of more importance than their as yet undetermined influence on heat losses.

# A Home Made Automobile Fire Extinguisher.

By J. M. PRUDDEN.

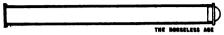
It is remarkable how few automobiles are provided with some sort of fire extinguisher, although the value represented by an automobile and the chances of fire are very great. This may be due to carelessness of the owners, it may be that the price is a deterrent, or even the appearance may be against the extinguisher. If the car should ever catch fire on some country road far away from water or help this neglect would certainly be deplored. The appearance is a small matter, for modern extinguishers are neat, and as for the pricewhy, it is the possible saving of money which would prompt you to get one. No matter how good a car may be, it is liable at any time to catch fire. No matter whether your car is insured or not, a fire may endanger life.

The principal difference between the two types of extinguishers, one using liquid chemicals and the other powder, is in relation to prices. Although the powder may not be so easily sprinkled in inconvenient places as the liquid may be sprayed, there is advantage in the powder in that it will not spread burning gasoline or oil, which are often the source of automobile fires, and, of course, the powder cannot freeze, as the

liquid might.

The modern fire extinguishers contain about 10 cents' worth of tin and 25 cents' worth of chemicals, and sell for \$2. By following the directions given below anyone can easily construct a fire extinguisher, even of brass, for less than \$1. At any plumber's a piece of 11/2 inch tin leader pipe may be procured, about 2 feet long. (This can easily be made from 24 gauge sheet brass.)

A bottom should be made and strongly soldered on, and the edge of the open top end turned over. Then a cover should be made which will fit tightly, and which should have a ring riveted to the top of it. The tube should then be filled with carbonate of ammonia (which can be procured cheaply at any drug store, and which should



SKETCH OF FIRE EXTINGUISHER.

be exposed to the air as little as possible), the cover put on and pushed down firmly. Since this chemical must be kept from contact with the air, in the manufactured extinguishers a very thin layer of solder is placed around the edge of the cover, rendering it airtight and yet leaving it so that it may be easily yanked off. It is not possible to solder with ordinary tools as thinly as is necessary, so sealing wax may be placed around the cap instead. In case of fire it is merely necessary to attach the ring in the cap to something, yank off the cover and sprinkle the powder on the fire.

It is surprising what a large fire this extinguisher will put out. It can overcome a fire covering 9 square yards and blazing nearly 15 feet high. It may be attached to a car by a strap or some similar device, but it should not be hung by the ring, for the jarring of the machine would break the sealing wax, decomposition would ensue from contact with the air, and the chemical would be worthless. If this extinguisher were made of brass and placed on the running board of a car it would be no more unsightly than a musical horn.

# Amount of Radiator Capacity Required.

BY ALBERT L. CLOUGH.

Although much experimental work has been done to determine the amount of heat which can be abstracted from a given extent and configuration of radiator surface by a current of air of given speed and initial temperature, when there is circulating within the radiator passages a current of water at a known initial temperature, the proportioning of a radiator adequate to cool a motor of given proportions is still pretty largely of an empirical nature rather than a matter of exact calculation.

Motor car manufacturers now hardly ever construct their own radiators, for the reason that the production of this auxiliary of the vehicle engine has been taken over by a number of manufacturers who devote their energies almost entirely to this specialized line of production, which they have brought to a high degree of refinement.

## THE USUAL PROCEDURE.

When an automobile manufacturer is bringing out a new model with a motor somewhat altered in dimensions and characteristics from that which he has hitherto used, experience as to the sizes of radiator required in former models is usually the basis of the specifications for the experimental radiator to be used upon the "model car" of the new product. A radiator is ordered, a certain amount larger or smaller than the one used upon the former car, and this is tested out thoroughly upon the new vehicle, and if satisfactory may be adopted. If not, a cooler of somewhat difierent dimensions is secured, and this is tested out in the same way. Or the manufacturer may furnish the radiator builder with a full description of the new motor and the new car, and the latter furnishes a radiator for test, which, if satisfactory, is adepted. Suggestions as to the fan design pipe sizes and pump capacity, are often made for the car manufacturer by the radiater maker.

# DATA GATHERED.

The writer recently took some pains to look up the subject of the dimensions of

the radiators fitted upon 1909 models of standard cars. These radiators comprised a considerable number of different makes, and included the true cellular and various forms of horizontal and vertical tubular types. The cars upon which they were used were equipped with four cycle, four and six cylinder motors of widely varying bore and stroke.

The number of cars studied was quite large. In each case the piston displacement of the motor in cubic inches was computed, and the whole volume of the active portion of the radiator (not including the tanks) was figured, and it was a matter of some surprise that the cubic inches of radiator volume per cubic inch of piston displacement as computed for these various cars showed no wider variations among themselves. It appears, in fact, that the space occupied by the radiating surfaces required to take care of the heat loss attributable to a cubic inch of piston displacement shows a decided tendency toward constancy, despite wide variations in the magnitudes of the two variables, and in the form of the heat dissipating surfaces.

## CYLINDER-RADIATOR VOLUME RATIO

The average number of cubic inches of cellular radiator allowed upon these cars per cubic inch of piston displacement figures about 4.25. and the average cubic inches of tubular radiator per cubic inch of piston displacement appears to be about 4.5.

It is perhaps rather surprising that there is so little difference in the space required by the two types, but it is pretty evident that the makers of the various radiator types have worked their respective designs to closely corresponding extremes of "volume efficiency," and it would appear either that the tubular type is about as effective as the cellular, or else that the users of the cellular type have been more liberal in their cooling provisions.

A provision of much less than 40 cubic inches of radiator volume per unit of cyl-

inder volume is decidedly uncommon, as is also the allowance of much over 5.0 cubic inches, despite great variations in the absolute dimensions of engines and of the radiators themselves.

The extreme thickness found in any of these radiators was 4 inches, and this value was reached only in the cases of a few large cars, where it was undesirable to further increase the frontal dimensions.

#### PUMPS AND FANS.

All the radiators whose dimensions were taken were provided with fans, and the circulation was by pump. A high speed of flow-seemed generally to be provided for, and the flow pipes were of good size. A half inch of cross section for each 6 horse power motor output is recommended by some radiator manufacturers.

Each radiator maker appears to adhere rather closely to a certain size and form of pipe, and thickness and spacing of fins, in building up his cooler, and the capacity of the radiator is generally altered by using a greater or less volume of this standard construction, cut to fit the bonnet lines of the car to which the radiator is to be fitted. It is this fact that gives to the "cubic inches of radiator per cubic inch of piston displacement" constant what little value it may possess in rough preliminary calculations. There is not necessarily any exact scientific basis for this criterion, although it is perhaps not easy to formulate a better one of equal simplicity, especially as comparative figures concerning the active exposed surface of different makes of radiators are rather jealously guarded by their manufacturers.

It is probably safe to say that any radiator of standard make, which is assisted by a fan proportioned in accordance with average 1909 practice, and through which water is properly pump circulated, will be on the safe side, as far as cooling surface is concerned, if it contains 5.0 cubic inches of volume for each cubic inch of piston displacement of the four cycle engine which it cools.

# FOR THERMO-SIPHON CIRCULATION.

Most radiator manufacturers explicitly recommend radiators of much larger size for use with thermo-siphon circulation—50 per cent. or more increased surface in some cases. Not enough data upon radiators operating upon this system has yet been gotten together to enable an empirical constant to be calculated. In a few cases of thermo-siphon cooled engines, which have come to the writer's notice, however, the provision of radiator volume is hardly any, if at all, more liberal than in cases where pump circulation is used.

As to the use of fans, many radiator manufacturers assert that their use is valueless, if not undesirable, except when the car is standing or at speeds below 15 miles per hour approximately, on account of the practical difficulty of producing an air suction equal to the natural air pressure drive to higher rates of motion.

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### The Selden Decision.

The decision of Judge Hough, upholding the Selden patent, constitutes a decided victory for the owners of the patent, the Electric Vehicle Company, and also for the Association of Licensed Automobile Manufacturers. The owners of the patent had triumphed over alleged infringers several times previously, as when the Winton demurrer was overruled, and when an injunction was issued against one Moore who failed to put in a defense, but all these successes count for little in comparison with the decision just rendered. In none of the former suits was the validity of the Selden patent put to an actual test, and it was a very prevalent opinion in the industry that it would not successfully withstand such a test. In fact this belief was so strong in recent years that the possibility of being compelled to pay royalties under the patent would have been laughed to scorn by many unlicensed manufacturers.

Now, however, the patent has stood the test. One of the best known judges of the United States Circuit Court, widely experienced in patent litigation, has declared it to be valid and legal, and to cover all forms of gasoline automobiles. Of course, as was

to be expected, this decision is not final. The interests involved are so large that the case will be carried to the highest court, and there is, of course, a chance of the present opinion being reversed by the courts, as has often occurred in the past. But it is obvious that the case of the complainants has been greatly strengthened by the present decision.

Judge Hough points out in his opinion that the granting of the patent by the Patent Office already raised a presumption in favor of the complainant, and the Winton demurrer decision, which was a controlling authority, to the effect that on its face \* \* the patent was valid, strengthened this presumption. Now these points in favor of the patent have been further added to by a decision holding it valid after a most prolonged legal battle in which apparently every vulnerable point was subjected to attack.

The decision provisionally establishes George B. Selden as the real inventor of the gasoline automobile. Selden may not have been the first to build a successful machine, but he is considered the first to correctly name all the essential elements of such a machine. The lustre which might thus have been conferred on Mr. Selden is somewhat dimmed, however, by Judge Hough's remark that "it is my belief that Selden had contributed little to motor car advancement in the United States, and nothing at all abroad."

However, the most important question raised by the decision is not one of credit for priority in invention, but a question of commercial control of the gasoline automobile business. The members of the Association of Licensed Automobile Manufacturers are, of course, not affected by the decision, because they have already recognized the validity of the patent. But if all the unlicensed makers should now be forced to pay tribute to the owners of the patent, it would not be surprising if the aggregate value of the products covered by the Selden patent during the entire time of its life were to be greater than that of the products covered by any other patent during a corresponding period. Although the royalties will probably be fixed at a low percentage, the amount will, no doubt, run far into the millions. As nearly as can be ascertained about 300,000 cars have been manufactured in this country to date. Of these about one-half, or 150,000, have been licensed under the Selden patent. The average value of the cars on which royal-

ties have not been paid may conservatively be placed at \$1,000, giving an aggregate value of \$150,000,000. The royalty originally paid by American manufacturers was 1½ per cent., and this percentage of the above amount figures out to nearly \$2,000,000. Present prospects would make it seem well within the limits of possibility that the royalties on the above basis on the cars that will be manufactured during the remainder of the life of the patent may reach \$5,000,000.

As we understand the matter, there are still a number of legal steps to be taken before the present case is definitely concluded, and then the owners of the patent will be in a position to propose terms to manufacturers who are not yet licensed. It is generally believed that no higher royalties will be exacted, at least not for cars already delivered by the manufacturers, than those which have already been fixed by the association. Unlicensed manufacturers who are not willing to meet the demands for royalty, if sued, may be able to secure immunity from injunction proceedings pending the trial of the case in the higher courts by putting up bonds. In any case the decision will probably have a rather disturbing influence on the trade and industry, tending to bring back the condition of uncertainty which prevailed shortly after the organization of the "Licensed" Association in 1903, and it is to be sincerely hoped that the owners of the patent, as soon as possible after the decree has been rendered, will come forward with a definite statement of policy, so that every manufacturer will know exactly where he stands, and the market will not be disturbed by frequent injunction threats.

## Maintaining Quality.

Perhaps the most difficult problem which confronts a company entering on the manufacture of automobiles is the question of how to keep the quality of their cars uniform, so that each car they turn out shall approach the standard which they believe desirable, or possible, for a car of that particular class.

Quality maintenance may be roughly divided under three heads, viz., maintenance of the quality of the material, maintenance of size and finish, and maintenance of a predetermined accuracy in assembly and adjustment.

The manufacturer can enforce his standards under each of these heads by specifications, inspections and tests. Fach of these

three methods of maintaining quality can be elaborated as much as is thought desirable. Thus the specifications given in an order for material may vary all the way from a plain order for so many pounds of "30 carbon" or "nickel" steel, through specifications which seek to maintain the quantity of each element in the steel between certain limits, through others which also specify physical properties which the metal must exceed, to those which in addition to the last take up the manufacture of the metal, and perhaps even the quality of the ore.

Naturally the more rigorous the requirements of the specifications the higher is the price of the metal, and the more frequent must be the tests and analyses to make sure the quality is maintained.

In the machine shop the sizes of each finished surface are usually specified on the drawings, together with the amount of variation from this ideal size which is allowable. The necessary quality of the surfaces is not usually specified, but is left to the judgment of foremen and inspectors.

Just what the limitations of size should be for any piece of work is a much discussed question, and long experience in manufacturing and assembling is needed in deciding on limits. It seems probable, however, that too close fitting should be avoided on most parts, and that a rather liberal allowance with the standards carefully maintained often gives better results as regards quiet and regular operation than does an allowance which is so small that it is not enforced by the inspection department. Limits which are so close that the shop cannot live up to the requirements usually tend to create friction between the manu-. facturing and the inspection departments, and often result in compromises and agreements in utter disregard of the figures on the drawings.

Close fitting of bearing parts usually makes a machine more expensive, but with the exception of a few hard worked bearings does not always make the machine more efficient. With regard to the spacing of centres for working parts and the alignment of attached surfaces, however, a high degree of accuracy usually results in a more efficient and quiet mechanism.

Care in the machine work and inspection usually results in reducing the cost of assembling, and the requirements of the assembling process usually play an important part in regulating the limits specified for the machine work. The accuracy of the final assembling and the care with which the car is adjusted, or "tuned up," to use a more descriptive phrase, probably play as large a part in securing satisfaction for the average user as anything we have previously mentioned.

Here, again, we find great differences in the practice of various makers. Some test the cars in the most perfunctory manner. Others test them rigidly, and every car must pass a thorough inspection, which includes the operation of every part and even the condition of small but important parts, such as the tightness of nuts and the presence of cotter pins. Naturally the results secured by these latter makers are more satisfactory to the purchaser than those of the former.

As stated at the beginning, uniform quality is difficult to maintain, but the maintenance of a fairly good quality is not nearly so difficult or costly as the maintenance of a very high quality. The question which confronts the manufacturer, then, and which is becoming more than ever important in these days of lowering prices, is: "What standard shall I seek to maintain?" At the present time there is no universally applicable answer. Probably there never can be, since the answer will very likely depend upon the class of people which it is desired to cater to. At the present time automobile work probably suffers fully as much from over-refinement as it does from careless workmanship.

There is a medium course in the writing of specifications for materials in the setting of limits on machine work, and in the final inspections and tests which will produce the most serviceable and satisfactory car at a reasonable cost. Only a few manufacturers have as yet approximated this course, but a good many of them are tending toward it.

In one respect, at least, the Selden decision came at an opportune time, and may have a decidedly beneficial effect. We are referring to its probable effect on the unchecked promotion of new manufacturing concerns. A too rapid growth has been fostered by the unprecedented demand for cars during the past year, which was largely the result of the general reduction in prices on moderate powered cars at the beginning of the season. Further reduction of prices may still further increase the demand, but it is obvious that this process of extending the market cannot be continued indefinitely, and if the present rate of expansion should

be kept up it would not be long before the supply of cars would overtake the demand, and the industry would be brought face to face with the serious problems consequent upon overproduction. If some of the numerous recent flotations should be nipped in the bud by Judge Hough's decision it would very likely be to the ultimate advantage of the industry.

# Electrically Preheated Vaporizing Surfaces.

A number of patents have recently been issued covering means for electrically heating the vaporizing surfaces around which the fuel vapor supplied to gasoline and kerosene engines is formed. The object of the arrangement is to facilitate starting under conditions of low temperature of the surfaces.

The claims cover means for supplying heat to internal vaporizing surfaces such as are employed in cylinders fed by fuel injection, and also to the surfaces of external vaporizers or carburetors. Suitably protected coils of wire or ribbon through which the currents are passed and which are arranged in suitable proximity to the surfaces to be heated are the means employed.

This application is of possible interest to motorists who house their cars in unheated stables and experience difficulty in starting their motors. The use of a torch to heat the parts is decidedly risky, and the ability to quickly heat the carburetor vaporizing chamber by connecting a heater arranged about it for a few minutes to the regular lighting circuit might prove a convenience. In fact an ordinary domestic electric heated pad or electro-therm can be used quite successfully for warming up the carburetor and the intake manifold.

# Coming Events.

September 20-22—New York, Second Annual Run Around Long Island, New York Automobile Trade Association.

Trade Association.

September 21—Riverhead, L. I., N. Y., Motor
Contest Association Meet.

September 21 to 29—Munsey Reliability Run, Washington, Boston and return.

September 24 and 25—Brighton Beach Track, Twenty-four Hour Race, Motor Racing Association, New York city.

October 7—Philadelphia (Pa.) Second Annual 200 Mile Stock Chassis Race in Fairmount Park, Ouaker City M. C.

October 30-Vanderbilt Cup Race, Long Island Motor Parkway, Long Island, N. Y.

November 6 to 13—National Automobile Show under the auspices of the N. A. A. M. at Atlanta, Ga.

November 9-Atlanta, Ga., Track Races, Atlanta Automobile Association.

November 22—Flag-to-Flag Reliability Run, from Denver to City of Mexico.

December 29-30—Philadelphia (Pa.) Annual Midwinter Endurance Contest, Quaker City M. C. December 31 to January 7—New York City Annual Show, Grand Central Palace, American Motor Car Manufacturers' Association.

January 8 to 15-New York Annual Show, Madison Square Garden, Association of Licensed Automobile Manufacturers.

February 5 to 12—The Ninth Annual National Show at Chicago, Ill.

# Some Points in the Operation and Care of Vehicle Batteries.

(Paper read by H. M. Beck before the Society of Automobile Engineers.)

With the rapid increase in the number ei electric vehicles, the question of the proper operation and care of the storage battery becomes one of increased importance. as the best vehicle will not run if the battery goes wrong. While under normal conditions the care of a battery is a comparatively simple matter, it must not on this account be entirely overlooked, and, unfortunately, there has been some tendency recently to minimize the actual attention required. This policy is not new, having been tried in other lines of battery work, and if continued is sure to result disastrously. Why not rather admit that a certain amount of attention is required and insist on it? The best battery can be ruined in a comparatively few charges or discharges, where it would have given a long life with proper treatment.

The instruction books furnished by the manufacturers go into the operation and care of vehicle batteries very completely, and as they have been revised from time to time, one of them now being in its sixteenth edition, they are up to date. It will not be necessary, therefore, to go into many of the details of operation, but there are certain points which are either frequently misunderstood, or else on which it would be well to lay special emphasis, as their importance has apparently not been appreciated.

A storage battery is chemical in its nature, rather than mechanical, and must not, therefore, be confused with mechanical apparatus. The latter gives much more marked warning when it requires attention, and the fact that a battery may be apparently operating perfectly when it requires attention is responsible for a great deal of battery trouble. When a battery finally breaks down permanent injury has been done, and while it can generally be doctored back into shape, it cannot be made to give the life it should have given. In probably no line of technical work is prevention rather than cure of so vital importance.

Unfortunately the chemical theory of the storage battery has never been definitely settled, but an approximate idea of what goes on during charge and discharge can be easily stated.

A storage battery from an elementary standpoint consists of two or more plates, positive and negative; insulated from each other and submerged in a jar of dilute sulphuric acid. The plates consist of finely divided lead known as the active material held in grids which serve both as supports and as conductors for the active material. The active material being finely divided offers an enormous surface to the electrolyte, and thus electro-chemical action can take place easily and quickly. Two plates such as described would have no potential dif-

ference, the active material of each being the same. If, however, current from an outside source is passed between them, one, the positive, will become oxidized, while the other remains as before, pure lead. This combination will be found to have a potential difference of about two volts, and if connected through an external circuit current will flow. During discharge the oxidized plate loses its oxygen and both plates will become sulphated until, if the discharge is carried far enough, both plates will again become chemically alike, the active material consisting of lead sulphate. On again charging the sulphate is driven out of both plates and the positive plate oxidized, and this cycle can be repeated as often as desired until the plates are worn out. Thus charging and discharging simply results in a chemical change in the active material and electrolyte, and the potential difference between the plates and capacity is due to this change.

In taking care of a storage battery there are four points which are of the first importance:

First—The battery must be charged properly.

Second—The battery must not be over-discharged.

Third—Short circuits between the plates or from sediment under them must be prevented.

Fourth—The plates must be kept covered with electrolyte, and only water of the proper purity used for replacing evaporation.

While, as already stated, it is impossible to give an accurate formula for the chemical changes which take place in a storage battery during charge and discharge, certain facts dependent upon these are well established, and are used as a basis for operation. These are the following:

Voltage—During charge the voltage of a battery gradually increases until the cells are fully charged, but it will then come to a standstill, and will not rise any higher, no matter how long the charge is continued. The maximum voltage thus reached is not a fixed point, varying widely at different times, depending upon the age of the battery, the temperature, the strength of the electrolyte and the charging rate.

During discharge the voltage falls, and if the discharge were carried far enough it would reach zero, but experience has shown that this point is much too low for safety, resulting in the rapid destruction of the plates.

Specific Gravity—Due to the fact that during discharge the active material of both plates becomes sulphated, the specific gravity of the electrolyte falls. During charge the reverse process goes on, the sulphate is driven out, and the specific gravity of the electrolyte rises. As with the volt-

age, the gravity will rise gradually during charge until all the sulphate is driven out of the plates, but will then show no further increase, no matter how long the charge is continued. The maximum gravity thus obtained is also a variable figure, depending upon the temperature of the electrolyte as well as upon the actual amount of acid and water present in the cell.

The fall in gravity is almost proportional to the ampere hours discharge. In other words, specific gravity readings can be used as an ampere hour meter, but, unfortunately, gravity readings are difficult or disagreeable to obtain in the case of vehicle batteries, so that this check on the discharge is not frequently used.

Gassing—Until nearly charged, the plates in a storage battery should absorb the energy put into them with little or no gassing. When they are nearly charged, the energy, instead of being stored, shows itself in the form of more or less gassing, the amount depending upon the rate of charge. During discharge a cell should never gas. If it does so, it is an indication that it has been run down much too low and needs immediate attention.

Of the above indications the first two, voltage and gravity, are those most commonly employed in operating. Gassing, while of great assistance as a guide or warning, cannot be depended upon for accurate results, and is only used when nothing but the most crude methods of operation are practical.

Either voltage or gravity readings alone could be used, but as both have advantages in certain cases, and disadvantages in others, it is advisable to use each for the purpose for which it is best fitted, the one serving as a check on the other.

Voltage has the great disadvantage in that it is dependent upon the rate of current flowing. Open circuit readings are of no value, as a cell reads almost the same discharged as it does charged. On the other hand, a voltmeter is a very easy instrument to read, and may be located wherever desirable

Specific gravity readings are almost independent of the current flowing, but the hydrometer is difficult to read, not very sensitive, and the readings must be taken directly at the cells.

Charge-In the case of the pasted type of plates, used almost entirely in vehicle service, experience has shown that the manner of charging has much to do with the life of the plates, and on this account it is sometimes stated that the life of a vehicle cell is proportional to the number of charges, rather than the number of discharges. On this account it is wise to charge the cells as moderately as practical. On the other hand, it has been found that if the plates are to be kept in good condition, it is necessary to occasionally charge them to a maximum, thus reducing all the sulphate. Also the different cells of a battery work as independent units, and while their efficiencies are approximately the

same, there is generally some slight variation, which if the cells are charged on a very efficient basis will sooner or later cause irregularity, the cells with the lowest efficiency dropping behind. It is necessary, therefore, occasionally to even them up or the low cells will get in trouble. To meet these conditions, charges are divided into two classes—regular charges which should be as efficient as possible, and overcharges given at stated intervals, which are carried to a maximum voltage and gravity, and intended to reduce all the sulphate in plates, and even up any irregularity in the cells.

Initial Charge—New batteries are usually received in a charged condition, but when this is not the case, the plates being shipped dry, or where the battery has been taken out of commission, it requires an initial charge before it is ready for service. This charge is not a complicated matter, but requires considerable time, frequently over 100 hours, and there is a very general tendency to cut it short. When the initial charge is not complete the plates will not be properly formed, a certain amount of sulphate will remain in them which will produce local action, and the capacity and life of the cells will be materially reduced.

In regular operation it is well to charge at the lowest possible rate. A large part of the wear on the plates is caused by the gassing, and the amount of gassing is reduced by a lower rate of current. Since the gassing occurs almost entirely near the end of the charge, it is especially important that the charging rate be low at this point, so that when the available time is limited the necessary number of ampere hours can be gotten into the battery with the least possible wear by having the current. rate high at the beginning of the charge and low at the end.

There is one point in connection with the charge which should be especially emphasized, namely, that the final voltage corresponding to a full charge is not a fixed figure, but varies widely, depending upon the charging rate, the temperature, the strength of the electrolyte, and age of the battery. For this reason, charging to a fixed voltage is unreliable and likely to result disastrously. The charge should be continued until the voltage or gravity cease rising, no matter what actual figures are reached. Old cells at high temperatures may not go above 2.4 volts per cell, whereas if very cold they have been known to run up to three volts.

The points to be especially emphasized in connection with the charge are:

First—On regular charges keep the rates as low as practical, and cut off the current promptly. It is preferable to cut off a little too soon rather than to run too long where there is any question.

Second—Overcharges must be given at stated intervals, and continued to a complete maximum. They should be cut off at the proper point, but when in doubt it is

safer to run too long rather than to cut off too soon.

Third—Do not limit the charge by fixed voltage.

Fourth—Keep the temperature within safe limits.

Discharge—The discharge largely takes care of itself, except that a battery should not be run down below its voltage limit. The rate of current has very little effect upon the life of the plates, provided the discharge is not carried down too far. Where a battery is completely discharged it should be charged as soon as possible, and if it has been run down too low the charge should be continued to a maximum similar to the overcharge.

Ampere Hour Meter-Many attempts have been made to develop apparatus which would automatically show the charge and discharge of a storage battery, but these have either been based on the wrong principles, or else the instruments would not stand the wear and tear to which they were subjected, and they have therefore not proved satisfactory. Within the last year or so, however, a mercury type ampere hour meter has been placed on the market, designed especially for battery use, and so far the results obtained have been very promising. This meter is equipped with a large dial and a pointer which can be set by hand to any point desired. This pointer revolves in one direction during charge, and in the opposite direction during discharge, and registers directly the ampere hour output or input to the battery. The mercury in which the armature disc is submerged acts as a dashpot, and seems to be very effective in damping the vibrations and jolts which such a meter has to stand.

During discharge the meter shows directly what capacity has been taken out, so that it is a simple matter to determine what is left in the battery. For charging the procedure is somewhat more complicated, although not seriously so. It is necessary to charge a battery for from 15 to 20 per cent, more ampere hours than are discharged in order to make up for the losses in the battery. The method used to accomplish this is to move the pointer ahead the proper number of ampere hours just before charging, then charge until the pointer comes back to zero. The meters are equipped with an electrical contact at the zero point, which can be made to automatically open the circuit if desired. As will be seen, this considerably simplifies the handling of the charge; but there is one point which must not be overlooked. and which should be strongly emphasized, namely, that the efficiency of a battery varies with the amount of work it does, being much lower for light work than heavy. In fact, as long as in commission, the battery needs regular charges, even if it does no work at all; in other words, its efficiency would then be zero. This condition can be handled in several ways. Under average conditions, it is probably safe to charge by the ampere hour meter for a

set period, say two weeks, provided at the end of this period the battery is given a regular overcharge. An alternative method is to give an additional charge once a week by the meter of whatever number of ampere hours is found needssary to keep the battery up. The regular bi-weekly overcharge will probably be found to be the safer method, especially in private service where the conditions are so variable, but whatever method is used, too much emphasis cannot be laid upon the fact that if a battery is to be kept in good condition, in addition to the ordinary charges with the ampere hour meter, regular overcharges must be given. The meter certainly gives promise of reducing the amount of attention a battery requires, but the danger is that it will therefore be assumed that it will eliminate all of it.

Short Circuits—Short circuits between the plates are largely eliminated through the use of the wood separator. This point therefore does not need any special attention beyond that of seeing that the separators are in good condition when installed. With the sediment under the plates, however, the case is different. It is a natural tendency to wish to run a battery as long as possible before putting it out of commission for overhauling. The result is that very generally the sediment is allowed to get up to the plates before the battery is washed. When the sediment reaches the plates there is a discharge of wasted current through it, which in turn necessitates that the cell be given more charge in order to hold it up, and the extra charging again throws down still more sediment. Further, the sediment becomes sulphated, and by local action with the active material of the plates in contact with it causes the active material to become sulphated, which again increases the tendency to washing out. The result is that the plates begin to lose their active material rapidly if the sediment is allowed to collect until it reaches them, and it is, therefore, evident that if a battery is to give its normal life it is absolutely essential that the sediment be cleaned out before, and not after, it reaches the plates. The rate at which the sediment collects depends largely upon the way a battery is handled, and it is, therefore, necessary to determine this rate for each individual case. A cell should be cut out after, say, fifty charges, the depth of sediment measured and the rate so obtained used to determine the time when the battery will need cleaning. As there is apt to be some variation in the amount of sediment in different cells, and as the 'sediment is thrown down more rapidly during the latter part of a period than at the beginning, it is always advisable to allow at least onefourth inch clearance. If the ribs in the bottom of the jars are 134 inches high, figure on cleaning when the sediment reaches a depth of 115 inches.

Before dismantling a battery for "washing," if practical, have it fully charged. Otherwise, if the plates are badly sulphated

they are likely to throw down considerable sediment on the charge after the cleaning is completed.

There have been a great many complaints of lack of capacity from batteries after washing. Almost without exception this is found to be due to lack of a complete charge following the cleaning. The plates are frequently in a sulphated condition when dismantled, and in any case are exposed to the air during the cleaning process, and thus lose more or less of their charge. When reassembled they consequently need a very complete charge, and in some cases the equivalent of the initial charge, and unless this charge is given the cells will not show capacity, and will soon give trouble again. This charge should be as complete as that described elsewhere in connection with the initial charge.

"Flushing" or replacing evaporation in cells with electrolyte instead of water is a most common mistake. The plates of a storage battery must always be kept covered with electrolyte, but the evaporation must be replaced with pure water only. There seems to be a more or less general tendency to confuse the electrolyte of a storage battery with that of a primary cell. The latter becomes weakened as the cell discharges, and eventually requires renewal. With the storage battery, however, this is not the case, at least to anything like the same degree, and unless acid is actually lost through slopping or a broken jar it should not be necessary to add anything but water to the cells between cleanings. Acid goes into the plates during discharge, but with proper charging it will all be driven out again so that there will be practically no ioss in the specific gravity readings, or at least one so slight that it does not require adjustment between cleanings. Thus, unless some of the electrolyte has actually been lost, if the specific gravity readings are low, it is an indication that something is wrong, but the trouble is not that the readings are low but that something is causing them to be low, and the proper thing to do is to remove the cause and not try to cover it up by doctoring the indicator. The acid is in the cells, and if it does not show in the readings it must be in the form of sulphate, and the proper thing to do is to remove the cause of the sulphation if there is one, and then with proper charging drive the acid out of the plates, and the specific gravity readings will then come back to the proper point. The too frequent practice in such cases is to add electrolyte to the cells in order to bring up the readings, which, as already explained, are only the indication of the trouble, and this further aggravates the condition, until finally the plates become so sulphated that lack of capacity causes a complaint. This practice of adding electrolyte to cells instead of water seems to be becoming more and more common. In general it is much the safer course to assume that the electrolyte is all right, and look for trouble elsewhere, than to attempt to doctor it by the addition of more acid, and a great deal of trouble today is the result of a misunderstanding of this one point.

The treatment required for bringing a low cell or battery back into shape, while quite simple, is one of the most misunderstood parts of battery operation. The causes of low cells may be very varied, but the results produced, and consequently the treatment required, are not so varied. The general procedure is as follows:

First-Restore the cell mechanically.

Second-Renew the electrolyte if there is any question as to its purity.

Third-Restore the cell electrically by charging.

Before dismantling a cell, if practical, have it fully charged, the mechanical restoration then simply covers the operation of examining the cell and putting it as nearly as possible back into its original condition. This should not be difficult for anyone who is familiar with the assembly of the elements.

Where there is any question as to its purity, the electrolyte should be renewed, as the expense is not great in the case of the small cells used in vehicle service, and it would hardly pay to have an analysis made. Where any considerable amount of electrolyte is under suspicion, the manufacturers will gladly analyze the same. It is well to always have the water used for replacing evaporation and new electrolyte, unless furnished by the battery manufacturers, tested

The most marked effect of an impurity is to cause the plates to become a bad color, the cells to become inefficient electrically, and in extreme cases the plates may be ruined.

When the electrolyte is renewed the jar and plates should be thoroughly washed, and the new electrolyte should be of about the same strength as that renewed in order to allow for any acid which may be in the plates.

The electrical restoration has been probably the greatest stumbling block, and largely through lack of understanding, as this operation consists in simply charging the cell until a maximum voltage and gravity is reached. The common mistake is to cut off the charge before it is complete, in which case the plates, being still sulphated, will not show capacity, and are likely through local action to soon get into bad condition again.

With the possible exception of trouble due to an impurity, it can be generally stated that chemically the final condition requiring treating is abnormal sulphating, and even where an impurity is present in the electrolyte its action is assisted by sulphating. It should be understood that sulphating is a normal as well as an abnormal process in the charge and discharge of storage batteries, and the difference is in the degree, not the process. The abnormal condition is that ordinarily referred to by the term. In normal service sulphating does

not reach the point where it is difficult to reduce, but if carried too far the condition becomes so complete that it is difficult to reduce, and injury results. A very crude method of illustrating the different degrees of sulphating is to consider it as beginning in individual particles uniformly distributed throughout the active material. Each particle of sulphate is then entirely surrounded by active material. The sulphate itself is a non-conductor, but being surrounded by active material the current can reach it from all sides, and it is easily reduced. This is normal sulphate. As the action goes further the particles of sulphate become larger and join together, and their outside conducting surface is greatly reduced in comparison with their volume, so that it becomes increasingly difficult to reduce them, and we have abnormal sulphate.

The general cure for sulphating is charging, so that a cell having been mechanically restored the electrical restoration consists simply in the proper charging. Sulphate reduces slowly, and on this account it is a good plan to use a rather low current rate. High rates cause excessive gassing, heating, and do not hasten the process appreciably, so that it is the safer as well as the more efficient plan to go slowly. A good rate is about one-fifth normal. The length of charge will depend upon the degree of sulphating. In one actual case it required three months' charging night and day to complete the operation, but this was, of course, an exceptional one. The aim should be to continue until careful voltage and gravity readings show no further increase for at least ten hours and an absolute maximum has been reached. In serious cases it may be advisable to even exceed this time in order to make absolutely sure that all sulphate is reduced, and where there is any question it is much safer to charge too long rather than to risk cutting off too soon. A partial charge is only a temporary expedient, the cell still being sulphated will drop behind again.

Since the specific gravity readings are affected not only by the charge but also by the evaporation and changes in temperature, it is advisable, where an absolute maximum is to be reached, to eliminate these. The evaporation should be replaced with sufficient frequency to keep the electrolyte accurately at a fixed height above the plates. In this way water is added so frequently that very little has to be added at any one time, and the effect on the specific gravity readings is negligible. The temperature variations are eliminated by reading the temperature of the electrolyte, when specific gravity readings are taken, and correcting the latter to some standard temperature, such as 70° Fahr. This correction is made by adding one point (.oo1 specific gravity) for every 3 degrees above 70° Fahr., and subtracting one point for every 3 degrees below 70° Fahr.

When the charge is complete the specific gravity of the electrolyte should be adjusted to the proper point, and the cell is ready for service. Where there is time, and the facilities are at hand, it is a good plan to take a test discharge in order to make sure that everything is all right.

Failure in the restoration of low cells is probably more often due to cutting off the charge too soon than to any other cause, and from the troubles which are being reported this point evidently needs to be brought out more strongly.

In closing, a word or two about the vehicles themselves As manufacturers we wish to admit without argument that the battery is the most important part of the vehicle, but, on the other hand, we would like to protest against the frequent practice of blaming the battery for everything that goes wrong. The battery is rated in ampere hours, not mileage, and when the mileage of a vehicle falls short trouble should be looked for in the vehicle as well as in the battery. Batteries are regularly rated at their four hour discharge rate, this being about an average running rate for vehicles. The capacity, however, varies widely with different discharge rates, decreasing as the rates increase, so that anything which causes the vehicle to consume more current will more than proportionately reduce its mileage. For example, suppose that due to inefficient tires, poor bearings or binding brake, a normal current of 20 amperes is increased to 30 amperes. If the ampere hour capacity were still same, and there were no other losses, the mileage would be reduced about one-third. This increase in current, however, reduces the actual capacity of the battery by about 10 per cent. The average discharge voltage is also reduced, and the drop in wiring of the vehicle is increased, so that the watts delivered to the motor are still further reduced, and finally the motor itself is somewhat less efficient at the higher rate, so that the net result is that the mileage of the vehicle, instead of being reduced by one-third, is actually cut down by about one-half. It is thus evident how important it is that the vehicle, as well as the battery. be kept in the best of condition.

As has already been stated, no attempt has been made to cover many of the details of battery operation, but rather to emphasize and explain some of the most common errors found in the handling of the vehicle batteries of today, and of these probably that which should be brought out most forcibly is the matter of flushing cells with electrolyte instead of water. Keep the plates covered with electrolyte, but use only pure water, not acid, for replacing the evaporation.

#### Premier Agents' Convention.

During the week beginning September 20 the Premier Motor Manufacturing Company will entertain its agents and representatives at the factory in Indianapolis. On Tuesday evening there will be a banquet at one of the hotels, followed by a run to French Lick Springs, and return on Wednesday and Thursday.

#### National Good Roads Convention.

The second annual national good roads convention was opened in Cleveland, Ohio, yesterday, September 21, and will remain in session three days. Most of the prominent organizations interested in good roads are represented at the convention, and the governors of many of the States in the Union have sent delegates. The United States Government is represented by Logan Waller Page, director of the United States Office of Public Roads, and members of his staff. In addition to the large number of addresses by highway engineers, etc., practical demonstrations are being given upon different roads in and around Cleveland. Another feature of interest is a large exhibit of road making machinery in the Central Armory of Cleveland. This is said to be the first time that such an exhibit has ever been arranged. The organizations officially represented at the convention are as follows: American Automobile Association, National Grange, United States Office of Public Roads, American Road Makers' Association, National Association of Automobile Manufacturers, Association of Licensed Automobile Manufacturers. and the American Motor Car Manufacturers' Association.

The Cleveland A. C., whose members have arranged the program for the practical demonstrations and social features and entertainments, are the official headquarters for the delegates and guests.

The convention proper is being held in the Chamber of Commerce Hall, where President Lewis R. Speare, of the American Automobile Association, delivered the opening address at 10 o'clock on Tuesday morning. Governor Harmon, of Ohio, then extended the welcome of his State to the delegates, and Mayor Johnson, of Cleveland, followed in welcoming the good roads enthusiasts to the city. Chairman George C. Diehl, of the national committee, acted as presiding officer, and introduced the speakers. Following is the program of the convention, which will be fully reported in our next issue:

TUESDAY, SEPTEMBER 21. CHAMBER OF COMMERCE HALL. MORNING SESSION.

10 a. m.—Opening address, President Lewis R. Speare, of the American Automobile Association. "Welcome to Ohio," Hon. Judson Harmon, Governor of State of Ohio.

10:25 a. m.—"Address of Welcome," Hon. Tom L. Johnson, Mayor of Cleveland,

10:40 a. m.—"The Second Annual National Good Roads Convention," and introduction of speakers. George C. Diehl, presiding officer and chairman of the national committee, directing the convention.

10:50 a. m.—"Good Roads of the State of Ohio,"
James C. Wonders, State Highway Commissioner
of Ohio

11:15 a. m.—"State Aid," Hon. James H. Mac-Donald, State Highway Commissioner of Connecticut.

AFTERNOON SESSION.

2 p. m.—"The National Grange and Good Roads," Ex-Gov. N. J. Bachelder, master of the National Grange.

2:30 p. m.—"The New England Plan for Connecting Lines of Trunk Highways," George S. Ladd, special good roads lecturer of National Grange.

3 p. m.—"The Farmers' Interest in Road Improvement," Hon. T. C. Laylin, master Ohio State Grange.

3:30 p. m.—"The New York State Grange and Good Roads Legislation in That State," Hon. F. N. Godfrey, master New York State Grange.

4 p. m.—"Good Roads in the State of Pennsylvania," E. J. Kent, vice president Automobile Club, Pittsburg, Pa.

4:30 p. m.—"Road Maps and Signs," Powell Evans, president Automobile Club of Philadelphia.

WEDNESDAY, SEPTEMBER 22.
CHAMBER OF COMMERCE HALL.
MORNING SESSION.

Convention called to order by Presiding Officer George C. Diehl, national chairman, at 10 a. m.

10:15 a. m.—"Road Situation in the United States as Compared with Foreign Countries," Logan Waller Page, director of Office of Public Roads, Washington, D. C.

10:45 a. m.—"New York State Trunk Lines," Hon. S. Percy Hooker," chairman New York State Highway Commission.

11 a. m.—"Illinois Good Roads," H. H. Gross, president Illinois Farmers' Good Roads League.

11:25 a. m.—"Treatment of Earth Roads," D. Ward King, Missouri State Board of Agriculture. 11:45 a. m.—"Postal Progress League," James L. Cowles, secretary and treasurer.

AFTERNOON SESSION.

12 noon.—Practical demonstrations and road inspections.

2:30 p. m.—Complimentary luncheon will be served at the Randall Track Clubhouse.

THURSDAY, SEPTEMBER 23.
CHAMBER OF COMMERCE HALL.
MORNING SESSION

The convention called to order by Presiding Officer George C. Diehl, national chairman.

10:15 a. m.—"Macadam Roads," A. B. Fletcher, secretary Massachusetts Highway Commission.
10:45 a. m.—"Bituminous Road Materials," Pre-

10:45 a. m.—"Bituminous Road Materials," Prevost Hubbard, chemist United States Office of Public Roads.

11:15 a. m.—General discussion.

AFTERNOON SESSION.

12 noon.—Boat ride on Lake Erie. Passenger steamer City of Detroit will leave foot of Superier street. Complimentary luncheon will be served on board.

8:30 p. m.—Theatrical performance at Chamber of Commerce Hall by the Hermit Club, of Cleveland. Music by Hermit Club Orchestra.

#### Speedway to Be Brick Paved.

A brick surface is to be placed on the course of the Indianapolis Motor Speedway at Indianapolis, this decision having been reached after a demonstration with a number of different materials. The paving work is now in progress, and will require about 3,500,000 brick. At the recent races on the course it was demonstrated that the crushed stone and oil surface would not be satisfactory for the purpose. The brick course will be the only one of its kind in the world. The company is also building an aerodome on the grounds for the aviation meet in October. It will be 300 feet long and 60 feet wide.

It is reported that the Japanese Government has purchased a motor truck for the Imperial Arsenal in Tokio from the firm of Laurin & Klement, Jungbunzlau, Bohemia. The truck is equipped with a four cylinder 18-22 horse power motor, and designed for useful load of 1½ tons. It is to be used for transporting military equipment between the arsenal in Tokio and machine shops which are located at considerable distance.

#### Maintenance and Repairs



#### Roadside and Emergency Repairs. By H. H. Brown.

Perhaps one of the best of the old proverbs for the motorist (especially he who drives his own car) to keep in mind is that "an ounce of prevention is worth a pound of cure," or to translate this into the language of the motorist, "an ounce of oil is worth a pound of new babbitt metal." It is probably a fact that the majority of road-side breakdowns, barring tire trouble, might be avoided by careful inspection of the car from time to time.

However, accidents will happen in the best regulated machines (as well as families), and in many cases are unavoidable. For instance, a stone or other obstruction may cause a leak in a low hung gasoline tank. A ball may crack in a bearing and untold havoc may result from this cause.

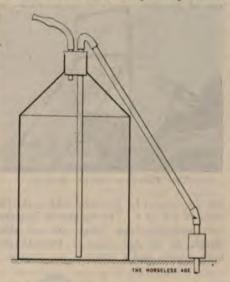
In a more or less permanent repair, made in a shop or garage, one is able to take a reasonable time to study how to do the job. Then, the tools and materials being at hand, it is in most cases a comparatively easy matter to proceed. However, in the emergency repair the circumstances are quite different, In the first place, tools, materials and skilled help are generally conspicuous by their absence. Then, again, little time may be given in which to figure out a method of getting over the difficulty. The following occurrence illustrates this latter point: Some time since a breakdown occurred on a road on which there was a trolley line that led to the nearest town, a distance of about 5 miles. The nature and extent of the trouble had been barely ascertained when the trolley car came in sight. It had been previously ascertained that the cars ran but once an hour, and it was then after 5 o'clock. As the town was a small one, if this first car was missed the chances for an all night stop of the machine at this point would have been exceedingly good. Fortunately in this case familiarity with the general features of the parts involved and their general dimensions allowed of working out a plan of action on the trolley while on the way to town which would allow for possible errors in estimation of dimensions, so that all was done within an hour and a return made on the next car to the machine, which was then able to proceed on its way in less than ten minutes.

To partially offset these disadvantages sightliness, durability and the comfort of passengers do not have to be considered to the extent that is only natural in the case of a more permanent repair.

The following incident may illustrate this assertion: Some time ago a chassis was delivered by an agent to a body builder in a town about 50 miles from the home city of the agent. When one of the salesmen attached to the agency went for the car it

was discovered that the copper tubing fitted with the proper unions for connecting the carburetor and gasoline tank was not in evidence. To have waited till it could have been obtained would have meant a day's delay, to say nothing of the time and carfares of the salesman. In this case, however, a 5 gallon kerosene can, with a stopcock at the bottom, as well as 10 or 12 feet of rubber tubing, was available. One end of the tubing was slipped over the stopcock on the can and made tight with twine. The can was then placed on the footboard to the left of the driver and the tubing led under the bonnet, and connected in a similar manner to the carburetor. This makeshift device only took about ten minutes to rig, and enabled the car to be driven a distance of between 50 and 60 miles, with only one filling of the extemporized tank on the road, and that at less than 15 miles from home.

It is seldom that two precisely similar



accidents happen to a motorist nowadays, and it is still more seldom that the same means of effecting a temporary repair are available. It is well, however, to figure out how else such a repair might be effected with the means at hand.

This is a good practice for a variety of reasons. While the method used may have been the best at the time with the means at hand, yet in another case the same means may not be available, or, owing to differences of the break, other means may have to be resorted to. Then, again, while there is, of course, nothing like practice, yet if one accustoms himself to figuring the way out of imaginary emergencies, when the real one comes he is much more likely to get out of it easily than if he had not given any thought to the matter.

Let us take the case in which the tank and carburetor connection was missing. It will probably have occurred to some that the rubber tubing might have been used to make connections direct between the regular tank and the carburetor. This, of course, might have been done, and probably would in case the 5 gallon can had not been available. However, there were quite a few practical reasons against this course.

In the first place, there was no stopcock at the tank. Secondly, a joint made between the nipple at the tank and the rubber hose could hardly be considered reliable under the circumstances, to say the least. It will readily be seen that quite a good sized leak might occur which would not affect the operation of the machine, but would perhaps leave it stranded at some very inconvenient point.

On the other hand, in using the can, the joint at the can was constantly under two pairs of eyes, those of the driver and the front passenger, and as the top of the can was off any undue loss of gasoline would soon have been noticed, and the defect sought and remedied.

To show what may be done in case of an accident, let us suppose that the gasoline tank has a leak in it which renders it for the time being useless, and that the gasoline pipe is broken off. On going to the nearest grocery store we find that the owner sells gasoline in ordinary cans, which are closed by a good cork stopper, of which he has plenty. Other than that, nothing is available, except what is on the machine.

On examination we find that a considerable length of the tubing leading from the carburetor is in good order. This is led up till it projects above the floor boards. Further examination shows us that we have quite a few feet of copper tubing which runs from our generator to our headlights. Also four pieces of rubber connecting tubing used to connect the lamps and the generator to the copper tubing.

In the first place a cork is used to form a reducing coupling between the gasoline piping and the smaller copper piping formerly used for the acetylene gas lead. A length of the copper acetylene lead is passed through the cork of the gasoline can until it almost touches the bottom. A smaller length is then just passed through the cork and a length of about a foot of rubber tubing placed on it. By a length of the copper and two small lengths of the rubber the can is now connected to the carburetor pipe. The can in this instance is placed to the left of the driver. By blowing into the short tubing on the can the gasoline will flow to the carburetor and will continue to do so, owing to the siphon action.

## Cranked Motor With Gears in Mesh.

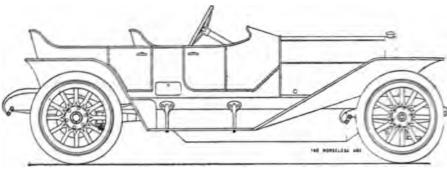
G. G. Swackhamer, of White Plains, N. Y., recently caused an accident by cranking his car with the change gear in the first speed position. Mr. Swackhamer's car was brought to a stop in the road owing to a block caused by an ice wagon. He jumped out to crank the engine, but forgot to first move the change gear lever to the neutral position, and the result was that as soon as the engine began to fire the car jumped forward, knocking him down, knocking down two people walking on the sidewalk and smashing a window.

## NEW VEHICLES AND PARTS >>



#### The G J G Car.

The G J G Motor Car Company, which has recently begun the manufacture of automobiles in White Plains, N. Y., has brought out a runabout model known as the Pirate, and a touring car model known as the Scout, both of 40 horse power, and listed at \$2,250 and \$2,500 respectively. The motor is a four cylinder vertical one with cylinders cast in pairs, of 43/4 inch bore and 5 inch stroke. The water jacket heads are separate, and the water is circulated through the cooling system by a centrifugal pump. A Bosch high tension magneto furnishes the ignition current. The change gear is of the selective type, with three forward speeds and one reverse. The shafts and gears are made of imported chrome nickel steel, and the shafts run in Rhineland imported annular ball bearings. The clutch is of the conical type, faced with leather, with springs under the leather to insure gradual engagement. The rear axle is of the full floating type, and the driving gears and shafts are of heat treated Krefeld imported chrome nickel steel. The front axle is a single piece drop forging of Krefeld chrome nickel steel, with Elliott type steering heads. The frame is made of heat treated pressed steel, and has four cross members. The motor and change gear are carried on a sub-frame. The frame is supported in front by semi-elliptic springs of alloy steel, 40x2 inches, and in the rear by three-quarter elliptic springs,



THE SCOUT CRUISER TOURING CAR.

56x2½ inches. The steering gear is of the worm and sector type, and is adjustable for wear. Both cars have a wheel base of 121 inches, a standard tread, and 34x4 inch wheels, with quick detachable rims. The gear ratio is 2½ to 1 for the runabout, and 3 to 1 for the touring car,



THE FRICTION WIND SHIELD.

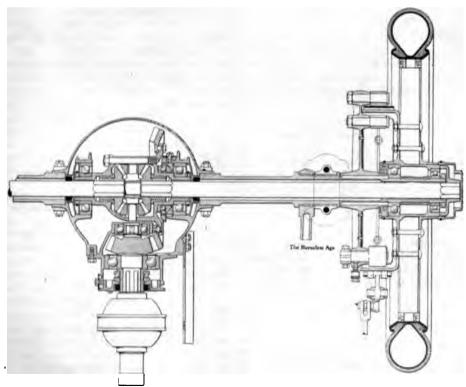
but the car can be furnished with a special ratio of 3½ to 1. The equipment includes two acetylene head lights, two oil side lamps, an oil tail lamp, a Prest-O-Lite tank, a horn, and a complete set of tools.



The automobile department of the American Locomotive Company, Providence, R. L. will next year turn out three chassis models, viz., a six cylinder, 60 horse power; a four cylinder, 40 horse power, and a four cylinder, 22 horse power. The most important change over last year's construction is that all of the new models will have shaft drive, while formerly the 40 and 60 horse power models were chain driven. The rear axle construction used on the two larger chasses is the same as that formerly used for the small town car. The axle is of the floating type, the supporting member consisting of a one piece drop forging, with a large ring in the middle and tubular arms stiffened by ribs above and below. Another change relates to the ignition system. The Bosch dual high tension system will be used. comprising both a magneto and batteries, operating on one set of spark plugs. A new line of aluminum bodies has been designed for 1910, the seat panels consisting of sheet aluminum and the door frames of aluminum castings. The moldings about the panels are rolled in with the aluminum sheet, instead of being attached separately. The prices of the different models have been reduced and are now as follows: Twenty-two horse power town car, limousine or landaulet, \$4,350; 40 horse power touring car, \$4.750; 40 horse power limousine or landaulet, \$5.500; 60 horse power touring car, \$6,-000; 60 horse power limousine or landaulet, \$6.750. The cars are furnished with a very complete equipment, including a top, side lamps, horn, tire brackets, etc.

#### The Friction Wind Shield.

A novel type of adjustable wind shield has been placed on the market by the Newark Rivet Works, 262 Lafavette street, Newark, N. J. As will be seen from the illustration, the shield is divided, as usual, a little above the centre, and is held in any position desired by friction. It is claimed that the shield absolutely stays where placed, but can be adjusted to any position from the driver's seat. The frame is made of seamless brass tubing, with a sub-channel to hold the glass firmly and prevent rattling. The top half can be swung forward to a position substantially parallel with the stay rods, when it will divert the air currents over the heads of the occupants of the car, thereby considerably reducing the air resistance.



SECTIONAL VIEW OF ALCO FLOATING REAR AXLE.

aimed. The lower half of the shield e arranged either vertically, as shown, lengthening the stay rods, inclined ardly so as to come as near to the g wheel as permissible, and this adent, in connection with the various adents of the top half, gives a great variof possible combinations.

The Auto Lighter.

Motor Specialties Company, of 222 street, Boston, Mass., have brought system for lighting acetylene autolamps from the driver's seat. The tus comprises essentially three parts, controller, an induction coil and a . The controller is a combined gas and electric contact device, and is se-



BURNER.

to the dash of the vehicle. By a turn of the handle to the left the om the generator or tank is admitted burner, and by the same operation a of sparks is produced which ignites mp. A motion of the handle in the te direction turns the gas off and exshes the lamps. The controller is atically locked when in either the or "off" position. The coil is the



CONTROLLER.

single unit vibrator coil, finished in any and brass. It measures 3x3½x5. With each outfit are furnished two is, which are tapped to fit the stand-urner thread, and can be instantly it to any headlight. A bracket clamped burner carries the two electrodes in the ends of which the igniting play. The spark gap is in close nity to one of the gas jets. Among ivantages claimed for the apparatus at it enables the driver to ignite and

extinguish the headlights from the seat without stopping the car, and obviates the annoyance of matches, especially in a strong breeze. The apparatus can be connected with any source of current.

#### The Metzger Motor Car Company— Organization and Product.

Articles of incorporation were filed in Lansing, Mich., on September 20 by the Metzger Motor Car Company, of Detroit, a new corporation to manufacture automobiles. The capital stock is \$500,000, of which \$300,000 is paid in. The stockholders and officers of the company are Byron F. Everitt, president; William Kelly, vice president, and William E. Metzger, secretary and treasurer. The new company will manufacture a car designed by William Kelly, who designed the Wayne and E-M-F cars. Mr. Kelly is one of the pioneers of the industry, having designed and built automobiles as early as 1899. Messrs. Everitt and Metzger are well known to the automobile trade and public, having been officials of the Everitt-Metzger-Flanders Company up to the time they sold their interests in this company to the Studebaker Manufacturing Company, on May 1 last. B. F. Everitt becomes president of the new company, which same position he held with the E-M-F Company. William E. Metzger, the secretary and treasurer of the new company, before his connection with the E-M-F Company was sales manager of the Cadillac Automobile Company, and had a retail store in

The new company will manufacture a runabout and a five passenger car, to be sold at popular prices. The models of the new car have been running in the streets of Detroit for some time, and a photograph of one of them is shown herewith. About thirty days ago the new company purchased the plant of the Jacob Meier Company, trunk manufacturers, located at Milwaukee avenue and the Grand Trunk Railroad, Detroit. This plant was built several years ago, and is said to be well located for the automobile business. It occupies 21/2 acres of ground. The plant is located between the East boulevard and the Detroit White Lead Works at the viaduct. Additional buildings have already been decided upon. The machinery is being installed, and

the company plans to begin deliveries within ninety days.

Gramm-Logan Company Increases Capital.

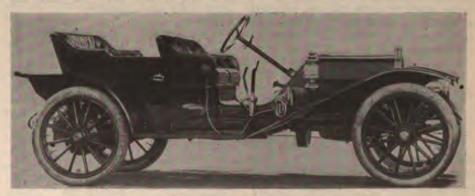
The Gramm-Logan Motor Car Company, Bowling Green, Ohio, held its annual stockholders' meeting at the conclusion of its first fiscal year on September 14. It was decided to increase the capitalization from \$100,000 to \$300,000, and to increase the size and equipment of the plant. The intention is to treble the output of the company for the coming year. The following officers were elected: A. L. White, president of the Lima Locomotive and Machine Works, of Lima, Ohio, president; B. A. Gramm, vice-president and general manager; F. E. Lamb, secretary, and J. B. Wilson, president of the Grand Rapids Banking Company, treasurer.

The New Buildings of the National Motor Vehicle Company.

The National Motor Vehicle Company, of Indianapolis, Ind., have begun the erection of a large addition to their Twentysecond street factory. The new building is of keystone shape, being 154 feet at one end and 99 feet at the other, and 210 feet long. It is of concrete construction to the window sill line and metal lath covered with cement and steel, and wood beam construction from there to the plate line. It has a gable roof. This building, part of which will be two stories, will be occupied by the blacksmith shop and assembling room downstairs, and by the trimming shop upstairs. Much new machinery is being installed.

General Motors Capital Now \$60,000,000.

The General Motors Company has filed with the Secretary of State of New Jersey an amended certificate increase in its capital stock from \$12,500,000 to \$60,000,000. Of this amount \$40,000,000 is common stock, and \$20,000,000 preferred stock bearing 7 per cent. cumulative dividends. The General Motors Company controls the Buick Motor Company, the Olds Motor Works, the Cadillac Motor Car Company, the Rainier Motor Car Company, the Reliance Motor Truck Company, the Oakland Motor Car Company and a number of parts concerns.



THE EVERITT THIRTY.

#### COMMUNICATIONS



## Why Bushings Turn on Shafts and Not in the Machine Parts.

Editor Horseless Age:

Although this system has been almost universally adopted by automobile designers, I am at a loss to see the advantage of attaching a bronze bushing to the pinion in place of pressing it on the shaft, as apparently there is the advantage of a larger wearing surface by the use of the later method. On a certain popular car there is used a triple gear drilled to receive a 11% inch bushing. The thickness of the bushing amounts to three-sixteenth inch, reducing the inside diameter to three-quarter inch, while by making the bushing fast to the shaft the bearing surface could be increased to 118 inch by the length of the bushing. It seems to me this would add to the compactness as well as the durability of some planetary transmissions. The same rule, of course, would apply to most of the present uses of bronze bushings. WALTER VETTER.

[There are two reasons why your idea is not likely to be adopted by machine designers. In the first place the friction and wear are proportional to the diameter of the friction surface or bearing surface. If you increase the diameter from three-quarter inch to 11/8 inch, leaving the total pressure on the bearing and the speed of revolution the same, the power loss due to friction would be increased substantially in the ratio of three-quarters to 11/8, which would be a disadvantage. The pressure per unit of surface on the bearing area would, of course. be less, but as the speed would be greater in the same proportion the bearing would wear at least just as rapidly as the smaller one, unless the regular bearing was altogether too small for the load it has to carry.

The other reason is that, where a bronze bushing is used the wear is not confined to the bushing, and quite often the shafts which run in these bushings are cut and worn to such an extent that they must be renewed. While it is often a very simple matter to renew one of these shafts (this is so in the case you cite, where the shaft probably consists of a short length of cold rolled steel), it would be quite expensive to replace the entire gear if its bore were worn, due to lack of lubrication or for some other reason.—Ep.]

#### Heating a Private Garage.

Editor Horseless Age:

Will you kindly tell me direct or through your columns what you think is the best way to heat a private garage? F. A. F.

[If the garage is not near enough to your home to make it practicable to run pipes from the steam or hot water heating system of the house to the garage, the best plan is to install a small heater of some kind in a separate room outside the garage, and conduct the hot water, steam or hot air through pipes in the garage. The one point to be looked out for is that there must be no communication between the garage and the room in which the heater is located, as in case gasoline should be spilled in the garage the vapor might get into the heater room and be ignited.

If any of our readers have solved the problem of heating a small detached garage in a simple and effective way, we should be glad for a description of their installation.—Et.]

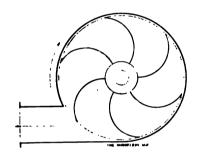
#### Centrifugal Pumps.

Editor Horseless Age:

I read with interest the article on centrifugal pumps in your September 8 number, and would like to ask your opinion of the design enclosed.

J. J. JENNINGS.

[The blades are too much inclined to the radia!s at their outer ends, and only the blades at any particular moment opposite the delivery pipe have any useful effect, as the rotor seems to fit closely in the casing



all around, leaving no space for the water to flow. The pump would work, of course, but would be rather inefficient.—ED.]

#### Queries.

Editor Horseless Age:

As a subscriber to your valued paper, I should like to ask the following questions through your columns:

What are the six principa! parts that should be examined in purchasing a motor car that has been run two or three years, what would be the best way to examine and test these parts, and what would be a good test to give the whole car in general?

Is it possible to muffle the exhaust gas of a four cylinder motor too much, and cause undue back pressure?

What are the advantages and disadvantages of the three cylinder, two cycle air cooled motor? Would such a motor, combined with a friction drive transmission and aluminum body, make a good light serviceable, five passenger car of 18 horse power and about 1,200 pound; weight?

"STUDENT."

[Probably the six most important parts to examine on a second hand car are the motor, the change gear, the steering gear, the tires, the brakes and the body. The best plan undoubtedly is to ask for a 50 or 60 mile demonstration, including some

steep hills. The motor is really the most important part of all, and in second hand cars it frequently shows a lack of power. The hill test will bring out whether it still develops sufficient power or not. The steering gear can be tested by turning the wheel first one way and then the other, and observing how much back lash it has, that is, how far it can be moved without moving the road wheels. The tires can be easily examined by the eye as to the condition of their threads. If these are much worn and cut, the probability is that a new set will have to be secured at an early date. Probably the best test of the change gear is to open the gear box and examine the teeth. If these are still of normal thickness, the gear is probably in good condition, whereas if the teeth have been worn thin the gear will not last long. To test the brakes, see whether they will hold firmly when set, and if there is still a possibility of further adjustment. The linkages can easily be examined for "shake." Another part that should be given an examination is the body, but this, of course, is a very obvious mat-

If the muffler of a four cylinder motor does not present a sufficiently large passage for the exhaust gases, either because the exhaust openings were made too small in the first place, or because they are choked by carbon and oil, the muffler will cause back pressure on the engine.

A three cylinder two cycle air cooled motor, if well made and so designed that it cools properly, should be a very good motor for a light car. Very much, of course, depends upon the design and the workmanship. A friction drive should be quite suitable for such a motor. We doubt, however, whether you will succeed in keeping the weight of a five passenger vehicle down to 1,200 pounds. We do not know of any regularly manufactured five passenger cars weighing as little as this, and vehicles built in an experimental shop are usually heavier than those regularly manufactured.—ED.]

## Starting Six Cylinder Engines on Compressed Air.

Editor Horseless Age:

I want to thank you for your reply in your issue of 8th inst, to my inquiry about starting six cylinder motors on compressed air, without the use of extra cams, valves, etc. In regard to the objectionable check valve I should explain that I have made a special form of check that works directly oppositely from the usual one, in that it is always wide open except when air pressure strikes it, when it closes, opening again immediately when the air pressure in the pipe is released or cut off.

JOHN W. SLATER.

#### Motor Horse Power.

Editor Horseless Age:

Will you kindly state in your paper the relative power, hill climbing ability, etc., of

a motor 41/2 bore by 41/2 stroke, and one 4 bore by 5 stroke, other things being equal? EDWARD HILL BALDWIN.

[According to the A. L. A. M. formula, which is almost exclusively used in this country, the first of the two motors should deliver 26.5 per cent, more power than the second. According to the German Automobile Technical Association's formula, which takes account of the stroke, the first motor should give 18 per cent, more power than the last. If the compression pressures are fairly nearly alike, the valves of proportionate size, and the workmanship is nearly the same on both motors, the motor of 41/2 inches bore is sure to give the most power.

#### Imports and Exports for July.

During the month of July last there were imported into this country 144 automobiles valued at \$300,025 and parts valued at \$86,-432, as compared with 115 automobiles valued at \$224,578 and parts valued at \$47,369 in July, 1908. Of the 144 cars imported last July, 60 were from France, 55 from Italy, 16 from Germany, 8 from the United Kingdom and 5 from other countries. During the seven months ending with July, 1909, there were imported 864 automobiles valued at \$1,592,643 and parts valued at \$460,998, as compared with 558 automobiles valued at \$1,170,624 and parts valued at \$298,755 during the same period in 1908, and 559 automobiles valued at \$1,827,590 and parts valued at \$466,637 during the same period in

During July last there were exported 470 American automobiles, valued at \$874,685 and parts valued at \$87,558, a total of \$962,-243, as compared with 238 cars valued at \$588,560 and parts valued at \$55,341, a total of \$643,901 during the same month last year. During the seven months ending with July, 1909, there were exported 1,780 cars valued at \$4,550,019 and parts valued at \$425,870, as compared with 1,528 cars valued at \$3,-223,166 and parts valued at \$390,775, a total of \$3,613,941, during the same period last

During the seven months ending with July, 1909, there were exported from this country 65 automobiles of foreign manufacture valued at \$290,881 and parts valued at \$1,000, as compared with 52 automobiles valued at \$265,711 and parts valued at \$2,702 during the same period last year.

We have received a copy of a "List of Permits for Operating Motor Vehicles in Ontario." It appears that this list is sent to the clerks of all the different cities in the province. We believe that the practice of issuing such lists in printed form is limited to the Canadian provinces. The large number of addresses in the United States contained in the list shows that many Ameriean motorists tour in Canada. Of course most of the Americans holding such permits reside in the boundary cities, Detroit and Buffalo, but there are also many addresses farther inland given.

#### The Frank A. Munsey Tour.

The Reliability Tour from Washington, D. C., to Boston, Mass., and back, organized by newspaper publisher Frank A. Munsey, drew thirty-seven entries as follows:

1-Chalmers-Detroit, Chalmers-Detroit Machine Company, Detroit. 2—Hudson, Hudson Motor Car Company, De-

troit, Mich.

Mitchell, W. M. Cram, Philadelphia, Pa 4-Premier, the Motor Car Company, Philadelphia, Pa.

-Washington, Carter Motor Car Corporation,

Washington, D. C. 6—Stevens-Duryea, F. W. Eveland, Philadelphia. 7—Ford, Charles E. Miller & Brother, Washington, D. C.

8-Jackson, Jackson Automobile Company, New York.

9-Maxwell, Lambert Automobile Company, Balti-

10-Oldsmobile, Olds Motor Works Branch, Balti-

11-Maryland, Sinclair-Scott Company, Baltimore. 12-Pullman, York Motor Car Company, York, Pa. 13-Pullman, York Motor Car Company, York, Pa.

14-Spoerer, Carl Spoerer's Sons Company, Balti-

15-Columbia, Frank P. Hall, Washington, D. C. 16-Croxton-Keeton, Croxton-Keeton Motor Car Company, Massillon, Ohio.

17-Croxton-Keeton, Croxton-Keeton Motor Car Company, Massillon, Ohio,

18-Corbin, Corbin Motor Vehicle Company, New Britain, Conn.

-Hupmobile, Joseph Wiesenfeld, Baltimore. 20-Winton, George F. Whiting, Baltimore. 21-American Simplex, Simplex Motor Car Com-

pany, Mishawaka, Ind. 22-Cameron, Cameron Car Company, Beverly,

Mass. 23-Atlas, Atlas Motor Car Company, Springfield,

Mass. 24-Crawford, C. E. Eckenrode, Baltimore.

25-Acme, N. S. H. Sanders, Boston, Mass.

26-Reno, John J. Loughran, Philadelphia, Pa.

27-Matheson, Matheson Automobile Company, New York.

28-Renault, L. H. Shaab, Baltimore, Md.

29-Hupmobile, Hupp Motor Car Company, Detroit, Mich.

30-Marmon, Nordyke & Marmon, Indianapolis, Ind.

31-Washington, Carter Motor Car Corporation, Washington.

32-Washington, Carter Motor Car Corporation, Washington. 33-Franklin, Franklin Automobile Company, New

34-Selden, T. S. Patterson, Rosemont, Pa.

35-Michigan, Michigan Motor Car Manufacturing Company, Detroit, Mich.

36-Elmore, Frank Hardart, Philadelphia, Pa. 37-Pullman, H. Clay Waldman, Jr., Baltimore.

The tour started from Washington yesterday, September 21. The contestants will compete for one grand prize trophy and six other trophies, all of which have been specially designed for the occasion.

The grand trophy has for a base a board slab of Flemish oak, upon which a design of silver is worked out. Engraving and etching are employed to reproduce a touring scene in which a large touring car is shown just making a turn in a country road. On the upper right hand section of the slab the dark sky is lighted by cloud effects in silver, while the upper left part of the space is devoted to the lettering. The relief work of the silver against the dark oak background makes a most attractive contrast. The whole scene is surrounded by a broad band of etched silver.

Plates also form the design for the awards in the six divisions. The plates are oval in shape and 22 inches high, measured through their greatest diameter. The base is mahogany mounted with silver. Near the top of the silver plate is an automobile with the Capitol as a background. Just below this is the inscription, which reads, "Frank A. Munsey Reliability Contest. First prize (name of division), Washington, D. C., to Boston, Mass., and return."

The technical committee, which has complete charge of the run after the start, is composed of Frank H. Trego, of the Chicago Motor Club, chairman; Dr. J. R. Overpeck, of the Quaker City Motor Club, and Jesse L. Cassard, Jr., of Baltimore, Md. Mr. Munsey is the publisher of the Washington Times, the Boston Journal, the Baltimore News and the Philadelphia Evening Times, and the contest touches all of the different cities in which his newspapers are published. Following is the complete itinerary:

	Miles.
September 21-Washington, D. C., to Bal-	
timore, to Philadelphia, Pa	195-3
(Via York and Lancaster.)	
September 22-Philadelphia, Pa., to Mil-	
ford, Pa	132.6
(Via Allentown and Delaware Water	
Gap.)	
September 23-Milford, Pa., to Albany,	1354
N. Y	158.5
(Via Goshen and Kingston.)	
September 24-Albany, N. Y., to Boston,	
Mass.	194.2
(Via Springfield and Worcester.)	
September 25—In Boston.	
September 27—Boston, Mass., to New	
York City	239.4
(Via Providence, Wilimantic, Hartford,	239.4
New Haven, Bridgeport.)	
September 28-New York City to Phila-	
delphia, Pa	194.3
(Via Perth Amboy Ferry, Atlantic City,	. 34.3
Camden.)	
September 29-Philadelphia, Pa., to Balti-	
more, to Washington, D. C	163.9
(Via Wilmington and Newark.)	
Total mileage	1,282.2
Number of running days-7.	
Average per day-182 miles	

#### Plantation Rubber Production of the Federated Malay States.

Vice Consul General G. E. Chamberlin, of Singapore, reports that the output of cultivated rubber in the Federated Malay States for the first five months of 1909 shows an increase of 72.5 per cent. over the same period of last year. The production during the first five months of 1909 was 1,976,898 pounds, as against 1,142,084 pounds during the first five months of 1908.

We have received a copy of the Official Guide and Route Book of the Professional Chauffeurs' Club of America. The book, which is bound in flexible leather covers, contains numerous touring routes in all parts of the East and the Middle West, a list of official hotels and garages (not very extensive), and a list of the officers of the club.

## Commercial Applications.



## The Taxicab Business in Detroit. By F. E. Watts.

This summer is the first season that taxicabs have been operated to any great extent in the city, so the business is not yet old enough to furnish any conclusive data as to what its future will be. Those who have been interested enough to look into the matter, however, appear to think that good profits will be realized if too many companies do not enter the field. The two companies actively engaged in the operation of cabs both plan to put more vehicles in service in a short time, and at least one new company will probably be started in the near future.

#### THE DETROIT TAXICAB COMPANY.

This is the oldest and largest taxicab operating company in the city. It is the successor of the Auto Express Company, which formerly operated a delivery service that was fully described in these columns. The development of the auto livery business in the city caused the management of the Auto Express Company to investigate the situation. They concluded that there was more money in carrying people than parcels, so discontinued their express business and established a rather extensive livery service. When the taxicab business first began its rapid growth in New York and some of the larger Eastern cities a few taxicabs were placed at the leading hotels. These proved profitable, and the number was increased. At the present time twenty-six machines are in service, and nineteen more will be added in a short time.

The offices and garage of the company are located on Randolph street, a few blocks from the business centre and from the leading hotels. Up to the present time this building has also accommodated the Detroit agency for the Oldsmobile, but as the new Oldsmobile Garage is nearing completion the sales and garage business will be moved to the new location in a short time.

These changes are at present so occupying the attention of Manager Scrimger that the writer has been unable to get the details of the business for this article. These details will probably appear in an early issue.

A few details of the equipment may be mentioned. The cabs are all Oldsmobiles, equipped with front wheel driven taximeters. Fisk tires and demountable rims are used. The company have also been trying out solid rubber tires and spring wheels made by a local company. Both a hacking and a stand business are conducted. All repairs are made in the company's own shop.

#### THE TAXI-CAB SERVICE COMPANY.

This company is better known to the general public as the "Yellow Bonnet Taxicab Company" on account of the distinctive color which the bonnets of their cabs are

painted. The cabs are Chalmers "30" limousines, and, although not designed for this work, are said to be giving most satisfactory service. Fifteen of them are in operation at the present time. Both a hacking and a stand business are conducted. There are some six stands, located at the principal hotels. Cabs are also sent to the depots to meet all trains and to the numerous boats which arrive from all ports on the Great Lakes.

For one or two passengers the rates are 30 cents for the first half mile or fraction; 10 cents for each quarter mile thereafter, and 10 cents for each six minutes waiting. For three, four or five passengers the running rates are increased to 30 cents for the first one-third mile or fraction, and 10 cents for each one-sixth mile thereafter, the rate for waiting remaining the same. No charge is made for idle mileage in answering calls from points within I mile radius from the City Hall, but when cabs are ordered from outside the mile circle a charge of 20 cents for each mile or fraction thereof, from the mile circle to the point ordered, is made under the heading of "extras." Fisk tires and rims are used under a maintenance guarantee on the basis of 3 cents a mile for each cab. The daily mileage of a cab varies widely. But the superintendent, Mr. Gareau, stated that he believed that the average would be about 70 miles.

During the past few months the business has developed into a twenty-four hour rush, but as the company has not been engaged in the service for a year yet no prophecy can be made as to what the demand will be during the winter months. A considerable business is done at special monthly rates, and quite a number of the customers have monthly bills of between \$300 and \$400. Plans for extending the business are under way, but have not yet taken definite form. It is thought, however, that Packard and Fiat chasses will be used when more cabs are put in service. Minor repairs are made at the garage.

#### A RETIRED COMPANY.

A call at the large new Woodward avenue garage, occupied by the Postal & Doherty Auto Company, disclosed the fact that they had discontined their taxicab service. At one time they ran five cabs. These cabs were put on as an experiment, and various makes were used, including a White steamer, a Maxwell and an Aerocar. The business was found to pay well, and calls were received during the entire twenty-four hours. It was practically impossible to get good drivers, however, and a few accidents occurred which cut down the profits. The management became convinced from watching the manner in which the cars were handled that the item of repairs would be considerable as time went on, so they decided to discontinue the business. At the time of the writer's visit their cabs had been out of service some months, but they still had about forty telephone calls for cabs each

At the present time the problem of get-

ting good drivers, men who will handle their cabs carefully, seems to be the greatest difficulty in establishing a profitable taxicab service in this city. In this connection Mr. Gareau told the writer of one driver who had increased the daily receipts of his stand from about \$5 to nearly \$40 a day, and who at the same time had decreased the repair bills on his cab in something like an inverse proportion.

#### Taxicab Business in the South.

While the automobile business in the South has proved very lucrative, the taxicab business is practically in its infancy, especially in Tennessee, where the business is limited to three cities—Nashville, Chattanooga and Memphis. However, the companies operating the machines are well pleased with results.

The State of Tennessee requires every automobile to be listed with the Secretary of State, for which a fee of \$2 is required, and the city ordinances also impose a nominal license fee. The fees for licenses are, therefore, of little moment, so that individuals or firms with small capital may engage in the business with profit, and doubtless the next year will see many more companies engaged in this business in Tennessee.

#### NOVELTY ATTRACTS

In practically every line of commercial endeavor, if something new or novel is introduced it at first draws patronage by reason of its novelty. If in the meantime the practicability of the innovation is demonstrated an established trade results, and the business is listed among the successful ventures. So far the taxicab business in Nashville promises to be so listed, and the Nashville Taxicab Company, which began operations three months ago, is making arrangements to quadruple its "rolling stock."

The municipal authorities make no very burdensome requirement. A license of \$10 for each cab is charged and \$12 per year for automobiles in the draying business. No machine may be driven within the business district at a rate exceeding 8 miles an hour, or over the streets in the residence section at a rate exceeding 25 miles an hour. Otherwise there are trouble and fines, which run from \$10 for a first offense to \$25 for the second and revoking of the license for the third offense.

The introduction of taxicabs in Nashville was attended with the usual rush for rides. The society element especially welcomed the taxicabs, for in days gone by ladies had been accustomed to paying from \$3 to \$4 for a cab of the "horse" variety in which to make calls and attend the various social teas, card parties, etc., and the reduction in social expenses was very pleasing. The novelty still clings and the business is good—so good, in fact, that the cabmen are on the anxious seat, with "fares" getting fewer and fewer all the time.

#### SOMETHING OF THE BUSINESS.

The Nashville Taxicab Company was chartered under the laws of Tennessee and capitalized at \$30,000, with E. C. Lewis, D. S. Williams, George E. Bennie, J. S. Frazer, George Frazer, Henry Frazer and Banks Bennie incorporators. J. S. Frazer is president, D. S. Williams vice president and Banks Bennie secretary and treasurer. The company maintains a garage at 112-114 Third avenue South, in which the taxicabs are stored and repaired, although the repairs have been of a very insignificant nature. The office of the company is in the same building.

The company operates the Sultan make of cars, manufactured by the Sultan Motor Company, of Springfield, Mass., the cars being 12 horse power, French rating. At the time of writing only three cabs are being operated, but within the month six others which the company has ordered will be placed at the command of the traveling public. The taxicabs are operated from public cab stands—one at the corner of Fourth avenue and Church street, another at Eighth avenue and Church street and the other at Fourth avenue and Cedar street, all taxicabs being in front of the leading hotels of the city and in the business district.

The machines have pneumatic tires and the Stepney spare wheel is used.

The rates are the same day or night. When the flag is lowered on the taximeter 30 cents appears, and this pays for the use of the cab until service to that amount either in driving or waiting has been rendered. Thereafter the taximeter registers to cents for each quarter mile or for each six minutes of waiting. For the first half mile or fraction thereof a taxicab costs 30 cents. If the taxicab is driven through a toll gate the passenger must pay the toll, although such a contingency will not arise in Davidson County, where all pikes and ferries are free. While the cabs or touring cars may be engaged by the hour, all such arrangements are made with the officers of the company, the regular rates being charged as are in vogue at the other garages.

Baggage, such as handbags, grips and suit cases, which the passenger may carry inside the cab, are not charged for, although baggage carried outside is charged for at the rate of 20 cents for each package.

The cabs will be prompt!y dispatched day or night on call to any address within 2 miles of the garage free of charge, but where the distance is over 2 miles a charge of 20 cents is made. When the cab is dismissed at any point over 2 miles from the garage, a charge of 20 cents is made for the return service.

The driver is charged with all amounts registered, and is not permitted to make any reductions therefrom, but will if required give a receipt for the amount paid. If the cab is disabled the service up to the

time of such disablement is charged for. A cab ordered and not used must be paid for up to the time the driver is dismissed, including sending charge of 20 cents.

#### NO DIFFERENCE FOR CAPACITY.

Whether one passenger or four occupy a taxicab the charge is the same, and for this reason ladies with invitations to a party living in the same neighborhood have been enabled to cut down "transportation expenses" considerably, and at the same time go to every party in a taxicab, whereas before, except in threatening weather, the street cars were used. The taximeters are driven from the front wheels.

The Nashville Taxicab Company has no maintenance contract with either tire manufacturers or manufacturers of cars, all repairs being done in the repair department of the company's garage.

The drivers are paid a percentage of the earnings. The daily average mileage of each car is seventy-five. Oil is furnished the drivers free, but gasoline is charged for at the rate of 12 cents per gallon.

While the patronage has been good all along, the officials of the company state that the most revenue comes in between 10 o'clock at night and 2 o'clock in the morning. On Sundays the cabs are busy most all the time.

In Nashville there is an interesting system in the operation of the street cars which plays into the hands of the taxicab company. The street car company has what is termed the "line up," all of the cars on the system being lined up at midnight in the transfer station, one car going out each line, and none after that until the next morning. This may be responsible for the increased patronage of the taxicabs, as many persons miss the midnight car, and have to get home. Whereas formerly the cabs were used, the taxicab now takes its place as it is faster and cheaper.

SPLENDID PUBLIC ROADS.

The man with an eye for investment would naturally ask about the population first and the condition of the roads next. While Nashville has approximately 125,000 inhabitants, they are not all of the class that can afford taxicab rides. In the matter of roads, however, the city is perhaps more fortunate than any city of its size in the South. Nashville is located in the limestone belt, and as a result the materials that enter into roads of the substantial type are easily accessible, and this fact has been noted by tourists who have made cross country runs through this section, the same being most favorably commented upon in their accounts of tours through the South. With bad streets and a big repair account there is scarcely much encouragement to the man in the taxicab business; in fact, the same causes have operated against the owner of machines for pleasure in many cities and towns, and it may be that the fact of Nashville being so favorably located in this respect is responsible for over half the automobiles in the State being owned by residents of this section.

## Motor Cab Items from Allentown, Pa.

There are now three companies operating motor cabs in Allentown, Pa. The Allentown Taxicab Company have recently moved to their new garage at 113 South Seventh street. They have seven cabs in service, most of them being Fords. The company's rates of fare are as follows: Day rates, in effect from 6 a. m. to 6 p. m., within city limits, for one or more persons direct to one address, 25 cents per person; for each five minutes of waiting, 10 cents. Night rates, for one person to one address, 40 cents; for two persons to two addresses, 70 cents; for each additional person, 30 cents; for each five minutes of waiting, 10 cents. For calling or shopping, a flat rate of \$1 per hour, or fraction thereof, is made between the hours of 6 a. m. and 6 p. m., while cars are let for continuous service for one to four persons at \$2 for the first hour and \$1 for each additional hour or fraction thereof. The company also makes special rates to a number of points outside the city.

The Maxwell Taxicab Company, whose garage is located at Church and Baumer streets, operates five Maxwell taxicabs and are said to be doing the greatest amount of business in Allentown at the present time. E. A. Krause is the proprietor of the service. The fare in the city is uniform, 25 cents per passenger per trip, day or night. The rates by the hour are \$2 for the first hour and \$1 per hour thereafter. The company also has a number of five passenger touring cars, which can be hired by the day or hour.

The Hamilton Auto Company, 943-947 Hamilton street, Allentown, operate four Ford taxicabs and charge the same rates as the above mentioned companies. They occupy the whole Roller Rink Building, which affords a floor space of 290x65 feet.

It will be observed that all of the above mentioned companies operate on a hacking schedule of so much per trip, and do not use taximeters.

## More Municipal Cars for Milwaukee.

Three new municipal cars will soon be purchased by the city of Milwaukee, if the council committee recommendations are adopted. The water works and the health department will each be given a touring car, while a roadster will be added to the automobile equipment of the fire department. It is the intention of Chief Clancy to provide all assistant fire chiefs with roadsters to replace the two horses each maintains. It is probable that all city owned cars will have the name of the city and department painted on the sides. The purpose of this, it is said, is to avoid the use of municipal automobiles for private uses. This evil has already taken root in Milwaukee. Alderman Stern, father of the ordinance, calls attention to the fact that the President's steam car and many Eastern municipal cars are so designated.

## Pennsylvania Railroad to Discard Horses.

It is reported that the Pennsylvania Rail-road has decided to substitute electric trucks for all of its horse trucks, and will begin the transformation of its service in connection with its shops at Altoona, Pa. At present the question is being studied whether it is best for the company to build the vehicles themselves in their shops at Altoona, or to have them built by outside firms making a specialty of such work. The company owns a large electric plant, so that the current necessary for charging need not be obtained from a central station.

#### Taxicab Service in Reading, Pa.

The Reading Taxicab Company, the only concern of the kind in the city, now operate seven Franklin cabs and two touring cars. Rates are 30 cents for the first half mile, 10 cents for each additional quarter mile, \$3 per hour, and \$1 per hour while waiting. Touring cars rent at \$3.50 per hour.

The cars are stored and cared for at the garage of the Reading Automobile Company, 28 South Fifth street.

#### Commercial Notes.

An automobile line for carrying the mails, passengers and freight is to be established between Las Vegas and Nelson, Cal.

Newton & Woodside, Buffalo, Wyo., are operating a steam car in a public service between Buffalo and Sheridan. The roads in the vicinity are very mountainous.

Automobile stages are being used in the Palo Verde Valley, Cal., for conveying land seekers to the tracts for sale. A trip that formerly required two days is covered in five hours with the autos.

Richard Nye, Santa Barbara, Cal., will shortly inaugurate a sightseeing service in Santa Barbara with two sightseeing cars. One will be operated between Santa Barbara and Montecito, while the other will run to Hope Ranch and Goleta.

The Municipal Hospital in Philadelphia has purchased its first motor propelled ambulance, which was built by the Knox Automobile Company, of Springfield, Mass. The car is equipped with a standard ambulance body, with all conveniences, including electric lights, folding seats, etc. The weight complete is 3,600 pounds.

Charles Ilten, Portland, Ore., will establish a taxicab service in that city with Franklin 18 horse power taxicabs, of which he has bought twelve through the Portland agency. It is expected that all of these cabs will be in operation by November 1. Mr. Ilten will operate the cabs from his new garage at Fourteenth and Burnside streets.

The trustees of Queens County, N. Y., who have charge of the Public Library system, have included in their budget for the coming year an item of \$2,500 for an automobile and \$1,200 for a chauffeur. The

automobile is to be used for transferring books between the sixteen branches and the main library, and to carry the trustees on tours of inspection.

The Motor Transfer Company at Fort Wayne, Ind., has placed four Cadillac taxicabs in service between the depots and hotels, and also for other trips around the city.

The Seeing California Traffic Bureau, of Los Angeles, Cal., has established a service in Pasadena in charge of C. A. Hubert. The Pasadena branch conducts a service from the Hotel Green to Orange Grove, for which trip a 5 cent fare is charged, and also a round trip of the city, including the ostrich farm in South Pasadena, for which the fare is 75 cents.

Chas, Day, of Navajo and St. Michaels, Ariz., will open a garage in Gallup, N. M., and establish automobile services from Gallup to St. Michaels, Fort Defiance, Ganado and Chin Lee; also from Gallup to Tohatchi and Chrystal, and from Gallup to Zuni and the various posts to the South. Mr. Day has four high powered cars, including a seven passenger Pope-Toledo, which he will employ in the various services.

## Philadelphia Garage Owners Organize.

The Philadelphia Garage Association has been organized during the past few weeks. and is said to already embrace 60 per cent. of all the garages of the city. The main object of the organization is said to be to correct the "joy riding" and commission evils. As long as the garages were unorganized it was practically impossible to put a stop to joy riding, because if an attempt was made the chauffeurs would take their cars to other places where they were allowed to take them out whenever they pleased. To incur the enmity of these chauffeurs practically meant bankruptcy for the garage owner. The new organization also plans to conduct an employment bureau which will maintain a register of chauffeurs. Owners of cars may there secure drivers whose records show them to be honest, careful and sober men against the payment of a small fee. Owners storing cars in the garages of members of the association have the privilege of examining the records of applicants for positions free of charge. The means by which the association hopes to defeat grafting and joy riding are explained in the bylaws which contain the following two paragraphs:

"A member (garage) found guilty of paying a commission to a chauffeur shall pay into the treasury the sum of \$25, and upon failure to pay this fine promptly shall be reported to the board of directors, and may be suspended by them.

"Each member shall, at the request of an owner, send the owner a car check sheet showing day by day the time his car entered and left the garage during the preceding month."

#### The Selden Case.

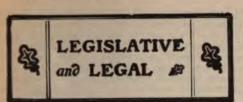
Proceedings in the Selden case are now resting, pending the entering of the decree. As the suit asks for an injunction to restrain the defendants from infringing the patent and for damages for the infringement already committed, it is expected that the decree will order the issuing of injunctions. Defendants then will have thirty days in which to file an appeal to the United States Circuit Court of Appeals. Ordinarily, this is the highest court to which a case of this kind can be carried. A petition can, however, be made to the United States Supreme Court, and if this court finds that the case involves questions which have never before been decided by it, it may take the case up. It is stated that very many such appeals are declined each year, but the Selden case admittedly involves novel points, and it would not be surprising if it were taken up by the Supreme Court.

As to the line of action that will probably be taken against other infringers, nothing can be learned at present. This matter will probably come up for decision before the executive committee of the Association of Licensed Automobile Manufacturers. The members of this association, as licensees under the patent, are interested in seeing it upheld, and it is understood that the association virtually conducted the litigation, although the complainants named in the suit are George B. Selden and the Electric Vehicle Company, now the Columbia Motor Car Company. Mr. Selden is the patentee and owner of the patent, the Columbia Motor Car Company are sole licensees under the patent, and the members of the Association of Licensed Automobile Manufacturers are sub-licensees.

It is to be presumed that aside from conducting the case in the Court of Appeals with vigor, the complainants will immediately take steps to enforce the rights conferred upon them by the patent against all other infringers. Suits have already been brought against some thirty or forty manufacturers, and whether preliminary injunctions are applied for on the strength of the decision remains to be seen.

#### Around Long Island Tour.

The New York Automobile Trade Association will hold its second annual "Around Long Island Tour" on Tuesday, Wednesday and Thursday of next week. Last year the trip was completed in two days, the run to Montauk Point being made on one day and the return the next. The start on the first day will be at Columbus Circle, New York. and the first day's destination is the Orient Point Inn. The second night's stop will be at the Irving Hotel, Southampton, and on the evening of the third day the tour will end at the Automobile Club of America in New York. The total length of the route is 335 miles. The roads are in good condition almost all the way, and if last year's event is a criterion the tour will be more an outing than a contest.



#### The Selden Decision.

One of the most celebrated cases in the annals of patent ligation was decided in the lowest court last week, when Judge Hough at New York sustained the Selden patent. The case against the Ford Company had been pending for six years, and the long delay before a decision was rendered caused interest in the case to wane, to a considerable extent, in recent years. It probably also lulled many of those interested in the outcome into a false feeling of security. The importance of the decision makes it worth the while to briefly review the litigation. The entire automobile world is interested in the matter, because not only the manufacturer of an infringing article but also the seller and user thereof are liable to the inventor or the owners of the patent.

The Selden patent, of which infringement was alleged, is No. 549,160, which was issued to George B. Selden, of Rochester, N. Y., November 5, 1895. Application for the patent was made as far back as 1879 (on May 8), the issuing of the patent being delayed by the applicant by making changes in the claims or taking such other steps as are allowed by the patent law. The broad claims of the patent were first drawn attention to by the Commissioner of Patents in his annual report for 1895, and the claims were printed in a special article in THE Horseless Age of December, 1896. Although the existence of the patent was thus early brought to the attention of the motor vehicle industry, no heed was given it by experimenters during the next few years, and no decisive steps appear to have been taken to compel its recognition by the industry until the patent was sold to the Electric Vihicle Company, of Hartford, Conn., which was in 1900.

Suit for infringement was then brought against the Winton Motor Carriage Company, of Cleveland, Ohio, at that time the principal American makers of gasoline automobiles in the United States, and their New York agents. Defendants entered a writ of demurrer, claiming that the patent was void for lack of patentability, but this was overruled on November 9, 1900. The Winton Motor Carriage Company some time later acquired a license under the Selden patent. The claims under the patents were then strongly urged, and about 90 per cen, of all American manufacturers of gasoline automobiles were induced to take license under the patent, and formed the Association of Licensed Automobile Manufacturers in New York in May, 1903. Under the terms of the license agreement each member of the association has to pay a license fee on the selling price of his product, of which nearly equal parts go to the Electric Vehicle Company and the association, respectively. The first action under the patent taken by the association was against Smith & Mabley, agents for French Charron cars. This suit was brought in April, 1903, but was settled out of court.

Among the few important manufacturers at the time the Licensed Association was formed, who did not join, was the Ford Motor Company, of Detroit. A suit was brought against the company and against its New York agents in October, 1903. It is this suit which has now been decided by Judge Hough. The complete opinion, with the exception of foot notes, follows:

The application for the patent on which these actions are based was filed in 1879—or more than sixteen years before the grant was made.

The principal claim in suit (No. 1) reads thus:

"The combination with a road locomotive, provided with suitable running gear, including a propelling wheel and steering mechanism, of a liquid hydrocarbon gas engine of the compression type, comprising one or more power cylinders, a suitable liquid fuel receptacle, a power shaft connected with and arranged to run faster than the propelling wheel, an intermediate clutch or disconnecting device and a suitable carriage body adapted to the conveyance of persons or goods, substantially as described."

The second claim varies from the first only in requiring the "suitable carriage body" to be "located above the engine," while the fifth claim sets forth substantially the same combination, but specifically describes the engine as comprising a plurality of cylinders with "pistons arranged to act in succession during the rotation of the power shaft."

These three claims are alleged to be infringed by all the defendants.

This statement of complainants' position seems sufficient to show that the subject matter of these suits is the modern gasoline automobile. The defendants are severally the manufacturer, seller and user of the Ford machine (a well known American make) and the maker and importer of the Panhard, a celebrated and typical French product. If these defendants infringe, it is because complainants own a patent so fundamental and far reaching as to cover every modern car driven by any form of petroleum vapor, and as yet commercially successful.

Such a claim lends interest even to such a record as is here submitted, and requires careful examination, to the end that the parade of forces in this court may at least serve to shorten and simplify the certain conflict in the appellate tribunals.

Upon one question of law all counsel are agreed—the patent claims under consideration are all for combinations; there is, of course, no agreement that the combinations set forth are patentable, and none as to the interpretation of their language if valid at all, but there is no denial that in form nothing but combinations are claimed.

This is emphasized because it seems to open and simplify the discussion. Selden does not pretend to have invented any new machine or combination of matter in the same sense that Whitney invented the cotton gin or Howe the sewing machine. He does not in application or claim specify any one mechanical device for which in branch of art a prototype cannot be found; there had been and were in 1870 running gears, propelling wheels, steering mechanisms, gas engines, etc., of many forms, and his patent covers no one form of any of these parts of his "road locomo-tive." He does assert that he released modified, co-ordinated and organized the enumerated parts (including the usual mechanical adjuncts of each part) into a harmonious whole capable of results never before achieved, and of an importance best measured by the asserted fact that after thirty years no gasoline motor car has been produced that does not depend for success on a selection and organization of parts identical with or equivalent to that made by him in 1879. If this be true, it may be held at once that in such a mental operation and such an important result therefrom, invention, and that of a high order, undoubtedly does reside. Where Bradley, J., declined definition, he would be a bold man who tried it, but I am sure that invention is easily discernible as that which vitalizes Selden's selection, and if that selection and its results have been truly described.

Broadly speaking, the defense in these cases rests on a denial of the truth of the foregoing summary of Selden's performance, which denial has two parts: (1) Selden did not do what he now asserts, and (2) defendants' combinations differ from Selden's, being neither identical nor equivalent.

In considering what Selden did, and the meaning of the words in which he described and claimed his achievement, it is to be remembered that whether his combination constitutes invention and whether it possesses novelty and utility are primarily questions of fact, as to which the very grant of the patent raises a presumption in favor of complainants, while the demurrer decision (in Electric Vehicle Company vs. Winton Motor Company, 104 F. R. 814) is here controlling authority to the effect that on its face, plus all matters of which the court can take judicial cognizance, the patent is valid.

To ascertain, therefore, how far defendants have succeeded in meeting the burden of proof, which in all matters of fact lies on them, it seems fair to begin by discovering from all the evidence what was the state of the art when Selden filed his application in 1879.

But what is the art as to which this inquiry is to be made? On this preliminary point it seems to me that defendants' testimony and argument have taken too wide a range, or at least laid undue emphasis on matters of little moment. This invention does not belong to the steam engine art, nor that of any engine, regarded alone; nor is it fruitful to examine carefully the development of traction engines, whether primarily designed to haul "trailers" or transport persons and goods over their own wheels. Boats also, and tram cars, propelled by engines of any kind furnish but a limited field for useful investigation; the inquiry is, how stood art (and science, too) in 1879, in respect of a self propelled vehicle with a considerable radius of action over ordinary highways, and capable of management by a single driver, and he not necessarily a skilled engineer?

Or (to use a phrase frequently occurring in the testimony and exhibits) what was known of the "horseless carriage" industry in 1879, either at home or abroad?

The answer given by the evidence is entirely plain—there was no such industry, the art existed only in talk and hope, no vehicle even faintly fulfilling the requirements above outlined had ever been built, and there is no competent and persuasive evidence that any experiment had ever moved a hundred feet, or revealed an organization warranting the expectation that it ever would do so.

Some examination of the kindred arts, above alluded to, serves to explain this situation. For more than one hundred years steam, as a prime motor, had dominated the world of mechanic art. Steam as the power for a self propelled road vehicle had been exhaustively worked over, and patents obtained, from Trevithick (British 2,599 of 1802) to Monnot (U. S. 197,485 in 1877), and the result was the traction engine; it made no difference whether it carried passengers or hauled freight, the actual type and only type was a boiler on wheels, of enormous weight, slow speed and small radius of action.

But the numerous experiments with steam road wagons had (however meagre the success attending them) served to make known to that wholly ideal and fictitious person, "the man skilled in the art," something of the organization of any road vehicle capable of operation by a small crew. Steering mechanism operated by wheel before the driver, independent turning of the fore wheels, the chain drive, as well as beveled gear connection between power and driving shafts, devices for disconnecting power from running gear and letting engine run free, plans for brake control of quite

a modern sort, and stowage of motive power in parts of the vehicle remote from passengers—all had been practiced or suggested. From patents and publications scattered over two continents and more than two generations there can be reconstructed (and defendants have done it on paper) something that is very far from even a good theoretical road wagon, but which does contain most of the elements of Selden's combination—and this represents the art, known to the man skilled in both theory and practice, a good mechanic, with a scientific education and widely read in the technical literature of all civilized nations, by whose incredible knowledge the achievements of patentees are so often measured.

Obviously if a fairly good road wagon cannot be reconstructed in 1909 out of materials so industriously collected from the scattered knowledge of 1879, it is desirable to ascertain whether there then existed some one lack, whether the art then required some one thing which was wholly missing—in order to produce a practical self propelled road vehicle.

It seems to me plain that there was such lack, and it may be stated in the language of one of the numerous inventors who procured long and elaborate patents relating to road locomotion, and never (so far as this record shows) did anything more.

Savalle (French 77,644 in 1867) says in a certificate of addition dated March 16, 1869:

"I have tried to apply to road locomotives several motors operating by air expanded by the heat produced, either by the explosion of the gas, or by air forced over a metallic surface, heated by coal or other combustible, or also by petroleum.

"These divers forms of motors apply perfectly when it concerns the traction of omnibuses or other large vehicles of this kind; but when it is necessary to apply this kind of locomotion to light carriages, only carrying one to six persons, or to drive a velocipede, these means become impracticable by the large space which they require."

The lack, the something that had to be supplied before it was worth while to organize the vehicle was the engine. Steam had thus far failed, and this record seems to show that at about the time Savalle wrote the gas engine as a road wagon motive power began to be mentioned in serious publications, and patent specifications.

Savalle was much mistaken in asserting that any of the assorted motors mentioned by him had successfully driven an omnibus or any similar conveyance, but he early hinted at the truth that in some form of motor, actuated by a product of petroleum, would be found, if not the immediate solution of the problem, at least the missing element that would make the solution sure.

This missing element Selden avers he discovered, and it follows that over his engine the conflict in these cases has raged through several volumes. In trying to ascertain, however, the status in 1877-9 of engines in any way resembling Selden's the court is fortunate in having in evidence a book entitled "The Gas Engine," published in 1885 by Dugald Clerk, who has also testified with admirable clearness as an expert for complainants.

It appears that the materials for this book were gathered during the very period of Selden's experiments, while so completely has Clerk furnished a classic on the history of the gas engine art that even counsel who sharply criticise his evidence support their arguments from his book to such an extent that it is not too much to say that many chapters thereof could be reconstructed from their briefs.

In 1879 "internal combustion" engines were well known, and had reached a considerable degree of commercial success—despite the fact that the reasons for their success or more frequent failure were very ill understood.

The fact that fuel might be burned in the engine cylinder itself, that such burning (if of gases) produced an expansion thereof, and that such expansion might be utilized by allowing it to push the piston, was and is the basic proposition.

This knowledge had produced the Lenoir engine in 1860 and the Hugon in 1865, constructed in close adherence to the steam engine of the day, and giving less than one horse power per ton of weight. Both normally used illuminating gas at atmospheric pressure.

The Otto free piston engine of 1867 marked an advance in effectiveness, but no form of gas engine had yet appeared, which (so far as shown) was more than suggested as the propulsive power of a road wagon.

In 1861 Million, and a year later Beau de Rochas, Siemens and others pointed out the advantage of compressing the gaseous fuel before ignition in order that the expansion should be both greater and quicker, with the greatest possible pressure at the beginning of the expansive movement; and in 1872 Brayton in America, and in 1876 Otto in Europe, introduced compression engines, the latter with great commercial success.

The change from a gaseous fuel burning at atmospheric pressure to the same 'fuel burned under compression was a change of kind, for, though formed of the same chemical elements, the compressed fuel possessed a power when used by men who live by breathing atmospheric air, that uncompressed and commercially possible gases did not and could not exert in any non-compression engine even as yet imagined. It therefore seems clear that the phrase "compression type," as applied to internal combustion engines, is reasonably indicative of a class, and appropriately describes an unmistakable and invariable species of the genus gas engine.

The evidence is persuasive that the increasing success of the gas engine, produced in the middle '70s of the last century, repeated dreams (they are no more) of applying a gas engine to a road wagon.

In 1877 Rosenwald (French 116,871) made a picture of a brougham having an Otto free piston engine perched in an apparently insecure position between passenger and driver. His is a paper patent only, and is in my opinion clearly shown to be inoperative for reasons of which one only may be mentioned—the most improved type of Otto engine then known weighed over half a ton per horse power; he did not use the most improved type, and did not propose any improvement or modification which would have prevented his brougham from going to pieces at the first jar of his motor. This patent is the suggestion nearest to Selden, and is mentioned for comparison hereafter.

Although by 1870 internal combustion engines had separated into the compression and non-compression classes, they were (and still are) all known as gas engines, irrespective of the condition of their fuel immediately before the work of preparing it for combustion begins. The term originated doubtless when coal gas was the only gaseous fuel known-but the vapor of petroleum or of any product thereof (gasoline or petrol) is just as much a gas as another, and thirty years ago there was, and there is now, no distinction generally obtaining between engines whose fuel as ordinarily purchased is coal gas, and those using gasoline or crude petroleum, provided that what ultimately burns in the cqlinder is that vapor substance, "capable of expanding indefinitely"which is gas.

But if the substantial difference between compression and non-compression engines was known and recognized, certain other terms of art which have been far too much used in this litigation were non-existent in 1879. A great superstructure of argument has been built upon the difference between 'constant pressure" and "constant volume' gines. These terms appear to have been devised by Mr. Clerk, and first used in his book before alluded to, as convenient phrases useful in studying the operation of engines, and classifying their phenomena. The terms are instructive, as is the separation of nouns into declensions and verbs into conjugations, but much of the argument about the words attaches an undeserved importance to them. In all internal combustion motors the result of expanding the burning gaseous fuel is to drive the piston; that is, the cylinder chamber in which the expanding gas is confined gives way on the piston side (so to speak). If the piston head offers no more resistance than will permit it to move under the expansive force produced by the initial compression alone, evidently since the piston moved under that pressure, it will be maintained to the end of the stroke, the expansion produced by ignition serving to keep up that "constant pressure."

If, however, the compressed charge must be ignited before the piston moves, then whatever volume thereof is introduced into the cylinder increases (by combustion) its pressure on the piston head, before the engine operates, and the machine is described as "constant volume."

In both phrases "constant" refers to condition, at the instant piston movement begins, compared with that at the moment the fuel charge is inserted. If between the two moments pressure increases, then the volume is constant; while if volume increases, pressure is constant.

These conditions are theoretic. If in a constant pressure engine the load or piston resitance is suddenly increased, the expansive power produced by compression alone may not start movement before ignition or explosion-and accordingly (if too much importance be attached to phrases) the type of engine has changed. Of course nothing of the kind has occurred-the relation of piston head to cylinder walls relative to time of explosion has changed, and it may nowadays (in many engines) be changed at will to suit load and speed by throttling and by timed ignition. These variations have been observed in all the engines testified about in this case. They occur, or may occur, in all compression engines, and are no more significant of specific or generic differences than are variations in rapidity of breath in different men, or in the same man at different times.

From this attempted outline of the knowledge and achievements of 1879, it seems to me that the way was singularly clear for anyone who would really produce the thing described in Selden's first claim.

Success is never anticipated by any number of failures, and when it is clearly kept in mind that what Selden claims is a combination, and not any one of its elements, the defendant's references to prior patents and publications may be thus finally disposed of so far as this court is concerned.

Much has been said concerning this inventor's personality and there is some importance therein as showing the likelihood of his comprehending his own experiments, and telling the truth about them. The record shows him always interested in mechanical pursuits, receiving an appropriate education for the theoretical side thereof, but not himself a skilled practical mechanician.

His application for a patent on a rubber tire wheel made in 1869 is significant and interesting, and, in view of quite recent litigation in this circuit, instructive. Taking his evidence in connection with his letters and notes, he is shown especially attentive to traction problems from his early manhood. I am persuaded that he carefully studied Brayton's engine and understood it practically-but his knowledge of the theory of thermodynamics seems fairly illustrated by a remark to his workman Gomm when his original engine turned over: "We have struck a new power." There is no satisfactory evidence that before application filed he knew thor oughly anything of Otto's compression engine. All this was not a very complete equipment: but he had the true inventor's enthusiasm, and for more than five years (as the Chief Justice said of Morse-15 How 108): "He pursued these investigations with unremitting ardor and industry, interrupted occasionally by pecuniary embarrassments."

When he was ready to file his application he had completed and experimentally operated one cylinder of a three cylinder engine of the general type Brayton has patented in 1872 and 1874. He intentionally built a plurality of cylinders, to obviate or minimize the necessity for a flywheel, he produced an enclosed crank case (which immediately reduced weight to an enormous extent) and used a small piston with a short stroke (which made possible the speed that would compensate for the loss of piston head area).

This engine (with allowance for adjuncts Selden did not use), but (as experience has shown) should have used, weighed less than 200 pounds per brake horse power, as compared with over 800 pounds in the lightest form of Brayton's, and is capable of

over 500 revolutions per minute, as against less than 250 by any type of gas engine known, built or suggested in 1879.

These I find to be the facts regarding the engine built by Selden before application filed. He then caused to be made a model and mechanical drawing of his suggested vehicle and actual engine and submitted the same with specifications and claims

to the Commissioner of Patents.

Avoiding for the present the language of his original application, and the effect of the numerous changes therein during its many years in the Patent Office, was the thing fairly revealed by the model and drawings, and conceived under the circumstances above set forth—the embodiment of a combination patentable in 1879?

think the answer is emphatically yes; that which is not obvious to skillful men is usually (as remarked by Mr. Clerk in his evidence) invention, and certainly what Selden shows in his model, and by the drawings which have remained unchanged for thirty years, was anything but obvious. The inventive act is shown by comparing Selden and Rosenwald. If the latter's brougham had actually carried its engine, and traveled even a little, he might nevertheless (on defendant's own argument) have found his patent invalid by American law, because each part of his vehicle was doing just what it had always done, without any new operative law," while his engine in particular was the same motor which before it was applied to the brougham had perchance driven a lathe and might tomorrow do something else. Rosenwald might held a mere aggregator (however successful), but Selden's combination cannot be taken apart and each element recognized as something that had done the same thing or sort of thing before,

The adaptation of the engine alone was something never before attempted (so far as shown); such adaptation might have involved an infringement on Brayton, but that did not prevent Selden's combination from being strikingly new, useful if it would work, and eminently patentable.

To sum up what is shown to have been the mental concept embodied in 1879 by Selden's model and drawings—with Brayton's engine in mind he organized a new road vehicle; to be sure, he did substitute one old and well known prime mover (gas) for another (steam), but in so doing he devised and used an arrangement of Brayton's engine never before attempted, one that Brayton himself never suggested, made or patented, and without which the road vehicle was an impossibility.

This mental concept constituted invention, if capable of reduction to operation, and if any operative example (not all operative examples) thereof was shown by the parentee.

If this doctrine be admitted or found, defendants before attacking the operativeness of Selden's vehicle seek to limit the scope of the patent by asserting that the combination is not infringed by any vehicle whose engine is not substantially identical with that described in drawings and specifications—notwithstanding the language of the claim "liquid hydro-carbon gas engine of the compression type."

Thus it is asserted that since Selden and Brayton show a spray of petroleum mixed with and carried by compressed air into the combustion chamber, they do not show a true gas engine; that the use of a carburetor separate from the engine proper and producing gaseous mixture which it feeds to the engine is something outside the patent and avoiding infringement; that a water jacket being shown by Selden in a peculiar and unusual equivalent, or attempted equivalent, is something outside the combination, and when used by defendants differentiates defendants' engine and combination from anything that infringes; and that since Selden evidently shows in his drawings ignition by a constant flame, he is confined thereto, and cannot use electric ignition, while defendants by using the same do vary the combination.

I have already tried to show that Brayton's petroleum engine, Lenoir's illuminating gas engine, and an Otto machine driven by gasoline are now, and were in 1879, not only "gas engines" in the

sense that they all operate on the same scientific principles, but they were known as and called "gas engines" by those best qualified to speak.

To make gas in one place rather than another must be an immaterial variation where a primary patent (such as this by complainants' contention) is under consideration; water jackets were old in 1879, and had been used in many forms, and both flame and electric ignition had been used and were well known to gas engineers of the day, although in 1879 it seems to me that the flame method was by far more successful than the electric as applied to compression machines.

The force of these objections, based on the face of the drawings and specifications, as compared with the claims, depends on whether the patent is viewed as a primary or pioneer one, or the contrary, and this in turn depends on the state of the art at the time of invention.

The art I have attempted to describe at perhaps too great length, because upon its condition this whole litigation seems to hinge.

If I have correctly apprehended it, there was clearly room for a pioneer patent, and it must now be held that on its face and in view of the art, Selden's is such a patent. This means that Selden is entitled to a broad range of equivalents and this rule as applied here results in this crucial inquiry: Was Selden (or anyone else) entitled in 1879 to appropriate as one of the elements of any patentable combination a "llquid hydro-carbon gas engine of the compression type"?

I think he was, and so was any other inventor, but he was the first so to do. If this he true, then the use or disuse of any then well known mechanical appliance which will increase the efficiency, usefulness or commercial success of such combination, without changing what defendants call its co-operative law, is on the one hand open to Selden, and on the other will not free defendants from infringement.

Although there were in 1879 many liquid hydrocarbon gas engines of the compression type, there was not one which in its then form could be made an element (and the most important element) in a road wagon combination, and the radical difficulty was the same that Savalle had confessed to ten years before.

Selden (on paper certainly, whether actually will be considered later) solved that difficulty, and such solution gave him the right to claim broadly the thing which was the leading element in his invention—when used in his combination. Thirty years have passed, and counsel admit that no successful gasoline motor car fails to use a liquid hydro-carbon gas engine—of the compression type—with a short rapid stroke, and enclosed crank case, and a plurality of cylinders.

These are the very things which are at the foundation of success. To be sure (as will be considered more fully later) no very great degree of success can be reached without improvement over 1870 in carburetors, and electric ignition, and increase of knowledge concerning the respective mechanical possibilities of two, four and six cycle engines; the faster also the reciprocating parts of an engine move the greater the necessity of constant and abundant lubrication, and Selden's lubriis confessedly primitive, and great difference between any results Selden's most optimistic supporter can claim for him in 1879, and the successes of 1909, arises from increased compression, so that engine weight per brake horse power has now been reduced to about 10 pounds.

But these are non-essential, if, in 1879, Selden could lawfully use as an element in his patentable combination, the "compression type," or species of a whole genus of engines. As already stated, I think he could, and did, and further showed and made an exemplar of said "type."

Thus far the claims and specifications have been treated as though they were presented to the commissioner in 1879, in the shape they left his office in 1895. This was not the case; nothing remained in 1895 of the language of 1879 but the description of the vehicle and engine (and not all of that); the claims were reworded and the specification amplified many times, and usually after a rejection made or criticism offered by the examiner,

Selden did nothing by way of amendment or reply for about two years—the extreme limit of inactivity permitted him by these rules of Patent Office practice.

By these means he received in 1895 a patent for an invention of 1879, and in the meantime had never built a motor car, and never succeeded in getting anyone sufficiently interested in his theories to experimentally try them out with larger means and better mechanical ideas than Selden himself had.

During the later years of this period, and while Selden was in very leisurely fashion combating examiners who evidently had small conception of what was meant by light self propelling vehicles usable on the common roads, Duryea, Olds, and others in America, the Panhard and Peugeot companies (and many others) in France were experimenting with actual cars, and in 1894 a public race meet was held in France, whereat cars now as archaic in appearance as Selden's demonstrated that they actually could propel themselves from Paris to Rouen at about 12 miles an hour. The engines of some of them were modified Ottos, and 'liquid hydro-carbon gas engines of the compression type," and it must be found that when den's patent issued there had been developed engines answering to his phrase, which as a matter of history are not derived from his engine-that others reached his type without knowledge of him or his labors; indeed (while certainty is impossible), it is my belief from this evidence that Selden has contributed little to motor car advancement in the United States, and nothing at all abroad. As a matter of fact, I believe that nearly all the cars made in the United States when these actions began were modeled on French ideas, and used engines descended from Otto through Daimler, and not from Brayton through Selden or any other American. In short, this American patent represents to me a great idea, conceived in 1879, which lay absolutely fallow until 1895, was until then concealed in a file wrapper, and is now demanding tribute from later independent inventors (for the most part foreign) who more promptly and far more successfully reduced their ideas to practice.

But the patent speaks from the date of its issue, and unless Selden did something unlawful during his sixteen years' wrangle with examiners, or unless intervening American rights, available to defendants, sprang up while Selden was rewording claims—he is within the law, and his rights are the same as those of the promptest applicant.

Without prolonging discussion, it may be held briefly that Selden did not overstep the law. He did delay; he was not in a hurry. He could not get anyone to back him, and doubtless appreciated that if he was ahead of the times it was wise not to let his patent get ahead too. If he had gotten his grant in 1880, without a moneyed backer, the patent might and probably would have expired or nearly so before anyone saw its possibilities; and if the business world had seen them within seventeen years, that term would then so nearly have expired that Selden would never have been able to get to final hearing before it run out. At best, an accounting and not an injunction would have been his lot. The difference he may well have considered as a lawyer, and personally I believe he did think of it.

If he did not delay unlawfully, what intervening rights did he permit to spring up?

Remembering that Selden clearly showed a "liquid hydro-carbon gas engine of the compression type" in 1879, and actually manufactured one, I think it clear that his original claim was wider than any of those in suit.

The third claim as originally filed read thus:

"The combination in a road locomotive provided with suitable running gear and steering mechanism, of a gas engine, traction wheels, and an intermediate clutch or disengaging device, substantially as set forth."

It is true that throughout the original papers he speaks continually of "Gas Engine L." that being the alphabetical designation given his motor in the drawing submitted; but the claim quoted shows how wide was his original demand, and without further elaboration I hold with complainants that all subsequent changes of claim are in diminution or contraction of this first statement of invention.

The file wrapper, cross examination thereon, and argument concerning it form a bulky volume, but it seems to me sufficient to quote from the amendment of June 6, 1889, when Selden amplified his specification by inserting the following:

"I have succeeded in overcoming these difficulties by the construction of a road locomotive propelled by a liquid hydro-carbon engine of the compression type, of a design which permits it to be operated in connection with the running gear, so that the full carrying capacity of the body of the vehicle can be utilized for the transport of persons or goods, and which, by dispensing with skilled attendance and with steam boilers, water, water tanks, coal and coal bunkers, very largely reduce the weight of the machine in proportion to the power produced and enables me, while employing the most condensed form of fuel, to produce a power road wagon which differs but little in appearance from and is not materially heavier than the carriage in common use, is capable of being managed by persons of ordinary skill at a minimum of trouble and expense, and which possesses sufficient power to overcome any usual inclination."

And at the same time he put what is now Claim into substantially its present shape.

The language last quoted is in the final specification, it describes the thing which Selden conceived and pictured in 1879; and in 1889 the man skilled in the art, though he knew more than he did in 1879, did not know as much as Selden sets forth in the quoted words. It was still possible for the gasoline compression engine to be made part of a patentable road wagon combination. No one in the United States had passed, or even caught up with Selden--while foreign efforts have been fairly and attractively told by Mr. Krebs, of the Panhard Company. He quite fully depicts the history of meritorious and successful efforts in road locomotion apparently as ingenious as Selden's, and more vigorously pursued, but they did not begin until after 1879, and in 1889 were still clearly behind Selden's concept.

Defendants have advanced many other arguments based on the contents of the file wrapper.

Thus the original third claim above set forth declares a combination in a road locomotive, while the first claim in suit covers a combination with a road locomotive. The change is declared to be an abandonment of the original combination. It is further shown that some patent examiner rejected certain claims, referring to the Pinkus patent (supra), and thereupon Selden amended the claims and disavowed and disclaimed Pinkus. The argument based on this is that since Pinkus "co-operative law" is the same as Selden's, the disclaimer of Pinkus was in effect an abandonment of the very combination now relied on.

I have already indicated my view of the major premise of the last proposition, but these arguments, and many others of the same ilk, cannot prevail if it be true that Selden clearly showed in 1879 the thing he had invented. If so, he could rewrite the description of that thing as many times as the rules of practice permitted down to 1895. That such rewriting is all Selden did I believe to be true.

Defendants now urge that Selden's invention is inoperative. The one cylinder engine built by Selden on the three cylinder casting in 1877-8 was put in evidence as Exhibit 47. Thereafter the cylinders of Exhibit 47 were all bored out or rebored, new working parts fitted to them, and the engine put into a vehicle, the whole called Exhibit 89, completed in the winter of 1905-6, and constituting the first physical embodiment of Selden's patent. The complainant licensee, Electric Vehicle Company, also constructed a new engine from the patent drawings (Exhibit 132) and a complete vehicle (Exhibit 157).

Defendants aver that neither of these vehicles is a Chinese reproduction of Selden's drawings, and have devoted volumes of print to recording and arguing about the performances of Exhibit 80.

In my opinion Exhibit 89 as constructed was such Chinese reproduction, Exhibit 157 was not—

complainants having changed the water cooling device, used only electric ignition and made some other departures from the mechanical details shown in the drawings. But these variations were (as previously indicated) within the range of equivalents permitted to a primary patent.

The evidence on the subject of operativeness is the most flagrant example of unsupervised testifying I have ever seen or heard of.

Whether in 1905 Exhibit 47 was any better than scrap, whether Exhibit 89 would start on flame ignition, whether Exhibit 132 showed diagrams revealing volume or pressure constant, were perhaps interesting but unimportant questions. They raised a false issue over which months of time and volumes of print have been expended.

The serious and I think only question was and is whether a machine made in substantial conformity to drawings and specifications, without going beyond the range of equivalents permitted, was operative, even though rudimentary. Exhibit 157 answers to this description, and its performances may I think be thus summarized—it is a wretchedly poor car for 1905; there were probably as good, if not better, cars in 1895, but it is a marvel of invention for 1879—and that is more than enough for the purposes of these cases.

One instance of alleged prior use remains. Before 1879 Brayton undertook to furnish an engine which would drive an omnibus to certain men in Pittsburg. It is shown that he endeavored to adapt his then well known engine to traction purposes. That he failed utterly is clearly proved; the reasons for his failure are not so clear, but the failure is enough to invalidate the defense.

No litigation closely resembling these cases has been shown to the court, and no instance is known to me of an idea being buried in the Patent Office until the world caught up to and passed it, and then embodied in a patent only useful for tribute.

But patents are granted for inventions; the inventor may use his discovery, or he may not, but no one else can use it for seventeen years. That seventeen years begins whenever the United States so decrees by its patent grant. That the applicant for patent rights acquiesces in delay, or even desires delay, is immaterial to the courts so long as the statute law is not violated. On these principles complainants are entitled to a decree.

The Panhard machine does not in my judgment infringe the second claim. Construed as they have been in this opinion, infringement of claims one, two and five by the Ford machine, and of one and five by the Panhard can hardly be said to be denied. It is so found, and decrees will pass accordingly.

C. M. HOUGH,

September 8, 1909. U. S. D. J.

Spark Plug Patent Litigation.

A. R. Mosler & Co., of New York, have commenced a suit in the United States Circuit Court in New York against the Auto Supply Company for infringement of the well known Canfield United States patent No. 612,701, granted October 18, 1898, for spark plugs, and owned by them. This patent is claimed to broadly cover a spark plug provided with a deep chamber or recess around the electrode for the purpose of preventing an injurious accumulation of soot or other foul matter on the insulation of the electrode, which is a feature of many spark plugs now upon the market in this country. Messrs. Mosler recently acquired the Canfield patent from the Association Patents Holding Company, a subsidiary organization of the Association of Licensed Automobile Manufacturers.

The City Council of Pasadena, Cal., has so amended the automobile ordinance of the city as to permit the transfer of a license from one car to another, if the original car is sold.

## To Manufacture Motor Trucks in the Far West.

The Spokane Motor Car Company has been organized with a capitalization of \$600,000, and incorporated under the laws of Washington, to manufacture in Spokane an original type of commercial automobile. The incorporators are V. E. Funkhouser, Portland, Ore., president; Edward Schulmerich, Hillsboro, Ore., vice president; F. M. Skiff, Portland, secretary; A. L. MacLeod, Portland, treasurer, and Thomas Bilyeu, Portland, general manager, who, with F. H. Whitfield, of Portland, and W. P. Lafferty, of Corvallis, Ore., compose the directorate.

President Funkhouser announced in Spokane that work on a plant to give employment to 150 mechanics would begin in a short time. The product will be confined to heavy commercial cars, propelled by gasoline, with power applied directly to all four wheels. A fifth wheel construction enables the car of 171/2 feet length to turn within its own length.

The truck has no rear axles. The rear wheels are supported by two suspension axles, supported themselves by steel frames and blocks on each side. The axle of the front wheels "plays" up and down in a groove 6 inches long, enabling the truck to pass over obstructions from 6 to 24 inches high without noticeably disturbing the platform. The loading space is so arranged that the load will be distributed on all four wheels, instead of the entire load being carried on the rear wheels, in order to get sufficient traction. A four cylinder gasoline engine is used, generating 50 horse power. The company plans to manufacture the car in several different sizes, from 11/2 to 7 tons capacity.

#### To Build Cars in Oswego, N. Y.

The Pell Motor Car Company has been organized at Oswego, N. Y., with \$150,000 capital stock, to manufacture low priced automobiles. The directors for the first year are C. C. Place, A. N. Radcliffe, John P. Miller, D. W. Pell, E. D. Long, H. A. Wilcox and C. A. Bentley. The election of officers will take place at an early date. The company has secured quarters in the Ontario Industrial Building now in course of erection, and will begin work just as soon as the building is finished. A model car has already been built to order outside. The organization of this company was first announced in these columns about a month ago.

#### Short Measure Gasoline.

Rudolph Baumert, Indianapolis manager of the Standard Oil Company, was arrested by Isidor Wulfson, inspector of weights and measures in that city, for giving short measure in selling gasoline. W. B. Craig, an automobile owner, made the complaint, and investigation showed there were 4½ pints short in 20 gallons. Baumert was fined in police court, but has taken an appeal to a higher court.

#### **OUR FOREIGN EXCHANGES**



#### Benz & Cie.'s Annual Report.

The annual report of Benz & Cie., the well known German firm, for the business year which ended on April 30 last, is not at all satisfactory. A reason assigned for this fact in the report is that during the past year the entire business was transferred to the new, large and modernly equipped factory, and this removal had a retarding effect on the work for months, besides causing considerable difficulty in the acquisition of new skilled metal workers. Interruptions were also caused by the necessity for acquainting the workmen with the new machines. This made it impossible to materially increase the output, while, on the other hand, the expenses were considerably increased by the enlarged scale of operations. The report continues that during the current year the output has been constantly enlarged, and a favorable balance is to be expected. The gross earnings of the company for the past year amounted to 2,092,094 marks, as compared with 2,342,-341 marks the previous year. The sales expenses rose from 1,036,655 marks to 1,345,-The operating expenses 617 marks. amounted to 369,782 marks, as compared with 362,973 marks. After writing off 320,-367 marks, there remained a surplus of 56,-326 marks, which was carried forward. The company distributed a dividend of 15 per cent. in 1906-1907, and of 8 per cent. in 1907-1908, but for 1908-1909 the dividend was passed.

#### British Patents Act.

According to Consul Horace Lee Washington, of Liverpool, the result of the first year's working of the British patents act has been that \$2,500,000 of foreign capital has been introduced into the United Kingdom, as the following indicates:

The value of the land and premises acquired by foreign firms who have decided to carry on their manufactures in this country in order to maintain patent rights is estimated at \$635,000. The expenditure for buildings was \$880,000; plant and machinery, \$895,000, making a total of \$2,410,-000. The annual local assessments on these new enterprises is estimated at \$135,692. In addition it is stated that a great many firms have arranged for English factories to manufacture their patented articles on a royalty basis. A specialist in factory property stated in a recently published interview that his firm was in negotiation with several German and American firms for the acquisition of sites and factories, principally in the chemical, engineering, electrical and rubber making trades, and that a French firm of pottery makers are seeking a site for a model village. He estimated that twenty-four firms are already manufacturing there as a result of the act.

#### Royal A. C. Does Not Want Speedways.

The Royal A. C. of Great Britain and Ireland held a discussion of the Lloyd George Road Improvement Funds Bill on September 3, and unanimously adopted the following resolution:

"That the general committee of the Royal Automobile Club and associated clubs expresses its satisfaction with the Development and Road Improvement Funds Bill (Par II), and further expresses the lrope that the attention of the Road Board will be specially given to the improvement and

francs more French automobiles than during the first seven months of last year. The imports of foreign cars into France remain in almost negligible quantity, the aggregate value for the first seven months of the year being hardly 4,000,000 francs.

#### Brazilian Rubber Exports.

Consul George H. Pickerell, of Para, transmits the following statistics and comments on the shipment of rubber from that Brazilian district for the past three fiscal years ended June 30 (kilo = 2.2 pounds):

				Europe		
Quality.	1907. Kilos.	1908. Kilos.	1909. Kilos.	1907. Kilos.	1908. Kilos.	1909. Kilos.
Fine	8,785,388	7,086, <b>966</b>	8,730,908	9,894,955	11,158,327	9,616,696
Medium	2,024,044	1,501,987	1,752,602	1,597,343	1,890,246	1,732,844
Coarse	5,839,035	4,414,167	6,074,267	3,245,317	3,452,788	2,684,025
Gaucho	1,627,631	1,655,160	<b>2,</b> 504,856	4,653,064	5,263,165	5,138,673
Total	18.276,098	14,658,280	19,062,633	19,390,679	21,764,526	19,172,238

widening of existing roads for facilitating motor traffic, rather than to the construction of special motor roads.'

The Scottish A. C. executive and legal committees held a joint meeting on September I, and the discussion brought out the fact that the views of these committees are substantially identical with those of the Royal A. C.—that is, they hold that the construction of speedways should be deprecated, and the improvement of existing roads encouraged.

#### French Exports for Seven Months.

The French exports of automobiles for the first seven months of the current year show a material improvement over the corresponding figures for last year, and only a slight decline over the record year of 1907. The value of the exports during the first seven months of 1909 was 85,687,000 francs, as compared with 77,694,000 francs during the same period in 1908, and 89,865,-000 francs during the same period in 1907. The distribution of the exports among the different countries was as follows:

	rrancs.
United Kingdom	38,207,000
Belgium	10,363,000
Germany	6,072,000
United States	5,395,000
Argentine	4,369,000
Algiers	4,000,000
Russia	2.966,000
Spain	2,120,000
Switzerland	2,085,000
Italy	1.941,000
Brazil	722,000
Austria-Hungary	623,000
Turkey	385,000
Various countries	6,439,000

Five of the above named counties have reduced their imports of French automobiles in comparison with the previous years, particularly Germany, whose imports show a decline of 1,679,000 francs; Brazil, 630,000 francs; Turkey, 71,000 francs; United States, 53.000, and Spain, 14.000 francs. The imports of the other countries show an increase, especially those of Belgium, which imported for 3,600,000 cost of ordinary methods.

"Contrary to the anticipation of producers the rubber production of last year has been considerably greater than that of the previous equal period, and has almost reached the amount produced in 1907, the year of greatest production. Notwithstanding this unexpected large yield prices have shown an enormous tendency to rise, and it would seem from present reports that the end has not yet been reached; \$1.65 per pound f. o. b. New York is high when one considers that just a little more than one year ago the same article was selling in the same market for 63 cents. It is too soon to tender any opinion upon the coming season's crop, but I feel sure that every effort will be made to take advantage of the present high prices. The effect of all this good fortune will hardly be felt before 1910, but some in anticipation of another successful year have commenced to lay plans for increasing and improving their present production facilities."

#### Lion Motor Car Company Organized.

The Lion Motor Car Company, of Adrian, Mich., was formally organized at a meeting at the Griswold House at Detroit on September 15. The new company is capitalized at \$350,000. The plant is to be located at Adrian, that city having granted a bonus of \$15,000 for the factory. The officers are as follows: President, Henry C. Bowen, Adrian; vice president, Fred Postal; secretary, Leslie Robertson, Adrian; treasurer. William E. Morey; assistant treasurer, William Shierson. The company plans to produce 2,000 cars next year. Work on the remodeling of the building was ordered begun at once. It is generally understood that the manufacture of the machines will begin the later part of this year.

Successful experiments are under way, near Nottingham, England, with a Britishmade agricultural motor. It is claimed to do plowing and harvesting at one-sixth the

#### MINOR MENTION



The Phoenix Automobile Accessories Company, of St. Louis, Mo., have established a branch at Kansas City, in charge of Chas, Thayer.

The W. A. Patterson Company, of Flint. Mich., one of the largest carriage concerns in the West, has broken ground for a new factory building for manufacturing automobiles.

According to a report from Anderson, Ind., the Indiana Rubber and Insulated Wire Company is erecting a new building in Jonesboro, Ind., to experiment with automobile tires.

The Kissel Motor Car Company, of Hartford, Wis., has doubled its capital stock in order to provide for the growing business. The capitalization now is \$400,000. Several additions are being built at Hartford.

Mr. Greenlaw has purchased all of Mr. Wordingham's interest in the Wordingham Foot Horn Company, of Milwaukee, and the name of the company has been changed to the Wordingham Manufacturing Company.

The new factory building of the A. O. Smith Company in Milwaukee, Wis., is nearing completion. The main building, which measures 1.025x287 feet, and is of solid concrete, steel and brick construction, is now under roof.

Wm. B. and Milton O. Bard, of Johnstown, Pa., have secured a patent on a four wheel drive, and are at present constructing a machine embodying the invention. They are planning to organize a company to manufacture the machine.

In the recent Lowell stock chassis race the cars finishing first to fifth were all equipped with Michelin tires. In the race for the Vesper Club trophy the first five places also fell to cars equipped with Michelin tires, and in the contest for the Yorick trophy first and second places were secured by cars fitted with Michelins.

Horace De Lisser, president of the Ajax-Grieb Rubber Company, has offered a trophy to be known as the Ajax Cup for the Star Tour, which started September 20 at Kansas City, Mo. This cup will be awarded to the contestant in the runabout division in either the dealers' or owners' class who crosses the finish line with the best score.

The Embree-McLean Carriage Company, of St. Louis, Mo., have entered the automobile field, and plan to turn out about 500 cars the coming season in three models, as follows: A 30 horse power light roadster, with 105 inch wheel base; a 35 horse power light touring car, with 116 inch wheel base, and a 40 horse power seven passenger touring car, with 120 inch wheel base. All three cars will be equipped with four cylinder, four cycle motors and three speed

selective steering gears. The first cars will be ready November 1.

The Overland Automobile Company have let the contract for a new building for its Toledo, Ohio, plant, to be located on Central avenue.

It is reported that the receivership of the Kauffman Buggy Company, of Miamisburg. Ohio, will shortly be terminated, and that the factory will be sold to a company which plans to make automobiles.

The Nordyke & Marmon Company inform us that they have not issued a statement to the effect that they will not take part in track races in the future, as was reported in one of our recent issues.

The Great Western Motor Car Company, Peru, Ind., held its annual meeting on September 14, and elected the following directors: Milton Kraus, R. A. Edwards, E. A. Myers, Albert Kittner, R. H. Bouslog, W. S. Mercer and A. L. Modurtha.

An improved steel guide post for country crossroads, which can be produced at low cost, has been invented by B. H. Cooley, of Campbellsport, Wis., and will be manufactured there. It consists of a 2 inch cast iron pipe, with a special interchangeable cap.

The York Motor Car Company, of York, Pa., who have been represented in San Francisco by Frank O. Renstrom for a number of years past, have decided to open a factory branch in that city, and have sent C. B. Gardiner there to represent them.

In Youngstown, Ohio, there are said to be about 125 electric vehicles in operation, and the Electric Storage Battery Company, of Philadelphia, is planning to establish a branch there for assembling batteries and doing repair work. A site on Belmont avenue is being considered, and the branch may be opened within a month.

The Hartford (Conn.) Auto Parts Company at its recent annual meeting elected the following officers: W. H. Cadwell, president and treasurer; F. H. Bogart, vice president and manager; F. L. Martin, secretary. The company manufactures universal joints and other parts. The company has increased its capital stock from \$50,000 to \$100.000.

This year Richard G. Wagner, of Mil-waukee, Wis., president of a syndicate of beet sugar manufacturers, inspected the beet sugar crop from an automobile, and shortened his annual tour of beet sugar fields by one-half. The factories as well as the fields are widely separated throughout the State. Mr. Wagner was able to drive directly into the fields and inspect the crop without leaving the car.

E. T. Rogers and R. T. Overbolt, who are said to be connected with a well known Wisconsin automobile company, are endeavoring to interest Des Moines, Ia., capitalists in a proposition to locate a factory there for the manufacture of automobiles for farm use, ranging in price from \$500 to \$800. Messrs, Rogers and Overbolt went to Des Moines on the invitation of

the Commercial Club, and while there were entertained by the Greater Des Moines committee.

Leslie Elliott, of Pomona, Cal., has bought a building on West State street, and will establish a tire repair shop there.

The Sellers Motor Car Company, which began manufacturing automobiles in Hutchinson, Kan., last summer, is now said to be turning out three cars a week, and plans to produce 200 cars for next season.

Nine cars have been entered for the twenty-four hour race, to be held on the Brighton Beach "motordrome" on Friday and Saturday of this week, viz., two Loziers, Buicks and Rainiers each, and Fiat, Palmer-Singer and American Roadster.

A meeting was recently held at the office of Mayor Breitmeyer, of Detroit, to discuss a proposition to establish a permanent automobile exhibition in that city. It was attended by representatives of most of the leading manufacturers. No definite action seems to have been taken.

Space diagrams and application blanks have been issued for the tenth National Automobile Show, which is to be held at Madison Square Garden January 8-15. First allotments of space will be made October 7. M. L. Downs, 7 East Forty-second street, New York, is secretary of the show committee.

The St. Louis branch of the Fisk Rubber Company, of which A. N. Stanley is manager, will soon have a new two story building, with an office and a salesroom on the first floor, and a repair room on the second floor. The present quarters of the company, at 3907 and 3909 Olive street, have become inadequate.

The Charles Waugh Company, of Cambridge, Mass., an old established carriage manufacturing company, has entered the automobile business and secured the agency for the trucks made by the American Motor Truck Company for Boston and vicinity. The Waugh Company makes bodies for these trucks to suit the different requirements.

The Reo Motor Car Company, of Lansing, Mich., on September 15 presented all their employees who had been with the company for a year or more with a check for a sum equal to 5 per cent. of their wages for the year. The company made a similar present to their employees a year ago. This year the aggregate of the checks amounted to \$10,000, which is \$3,000 more than the amount last year.

Following the resignation of Alfred S. Koto, assistant manager of the Warner Instrument Company, of Beloit, Wis., it is announced that Mr. Koto, with Thomas Odee, will start a manufacturing plant at Beloit. It is said that the product will consist of automobile devices, parts and accessories. Mr. Odee has been superintendent of the gasoline engine department of the Fairbanks-Morse Manufacturing Company at Beloit for several years, and is an experienced designer and builder. The T.

A Johnson wagon works factory has been leased for the new plant.

#### Club Notes.

The new clubhouse of the Dixon (Cal.) A. C. was dedicated on September 17. The club owns its own garage, the use of which is free to members and their friends.

Motorists of Athens, Sayre and Waverly, Pa., organized a club at a meeting held on September 7, starting with a charter membership of sixty-two. The officers of equipped with tachometers, which is to be of of Athens, president; Frank A. Bell, of Waverly, vice president; J. T. Corbin, of Athens, secretary, and C. C. West, of Sayre, treasurer. A committee on constitution and bylaws was appointed.

## New Commercial Vehicle Concern in Minneapolis.

The Robinson-Loomis Motor Truck Company have been incorporated in Minneapolis, with \$50,000 capital stock, and have secured a plant at Second avenue North and Seventh street. The company will manufacture the Gopher truck, and handle the Reliance trucks and delivery wagons in the Northwest. T. F. Robinson, president and general superintendent, has been engaged in the commercial vehicle business for some years, having been manager of the only exclusively commercial garage in Minneapolis, while F. L. Loomis, secretary and treasurer, was formerly sales manager for the Reliance Motor Truck Company.

The Gopher truck, Model A, is a two cylinder, 22 horse power vehicle, while Model B is equipped with a 30 horse power motor. Both machines have force feed lubrication and a water cooling system. Engine speed is controlled by spark and throttle levers on the steering column. The cars are fitted with a selective type of change gear, giving three forward speeds and one reverse. The rear axles are of solid square section, 2x2 inches, while the front axles are of 2 inch I section. The car has a wheel base of 98 inches and a side chain drive to the rear wheels. The I ton model sells at \$1,800 and the 2 ton at \$2,200.

Overland Southern Company Organized.

The Overland Southern Company has been organized at Atlanta. Ga, and on Octoher 15 will occupy the Peachtree Auditorium as a garage. The building is at present being overhauled and remodeled. H. L. Hopkins, manager of the Atlantic Refining Company, is president of the Overland Southern Company. R. C. Smith, formerly of Lansing, Mich., who has been connected with the Reo interests, will be sales manager of the company, and John N. Willys and F. A. Barker, of the Overland Automobile Company, will be memhers of the advisory board of the Overland Southern Company. The territory of the new company will comprise North Carolina, South Carolina, part of Virginia, eastern Tennessee, Georgia, Florida, Alabama and the West Indies. The company plans to open a showroom on Peachtree street in the vicinity of the Auditorium.

## Rambler Factory to Drop Forge Its Own Crank Shafts.

Thomas B. Jeffery & Co. have just put in a giant forging hammer, for making all crank shafts, connecting rods, front axle yokes and other heavy forgings. It has a falling weight of 3,500 pounds, making it capable of striking a blow of approximately 15,700 pounds. The anvil block weighs 70,-000 pounds, and the total weight of the hammer is 98,000 pounds. This press has been set up on a foundation of solid concrete 16 feet deep and 15 feet square, with cushions consisting of oak timbers. In addition to this a 500 ton drawing press for the shaping of brake drums, clutch cones and other heavy drawn steel parts, has been installed. This press weighs 60,000

#### Overland Capital Increased.

Directors of the Overland Automobile Company held a meeting at the factory in Indianapolis on the afternoon of September 15, and voted to increase the capital stock from \$800,000 to \$1,500,000. It was also decided to change the name of the company to the Willys-Overland Company. The company states it will build 20,000 cars during the coming season, of which about 9,000 will be made in Indianapolis and 11,000 at Toledo, Ohio. Recently three large factory buildings have been completed in Indianapolis.

#### Ohio Agencies Consolidated.

By the incorporation of the Charles Schiear Motor Car Company, with a capital stock of \$25,000, the Southern Ohio Motor Car Company, of Columbus, and the Evanston Auto and Garage Company, of Cincinnati, have been merged into one corporation. The incorporators were Charles Schiear, C. Roy Clough and others. A branch will be operated at 3705 Main avenue, Cincinnati, and another at 61 East Spring street, Columbus. The principal part of the wholesale business will be conducted at the Columbus branch, of which C. Roy Clough will be manager. The corporation has about fifty counties in central and southern Ohio for the Hupmobile and Velie lines. Others will be added as soon as contracts are signed.

## Wheel Company to Make Motor Buggies.

The Whiteside Wheel Company at Indianapolis, which has devoted its attention to the manufacture of wheels, will bring out a high wheeled car for the season of 1910. It will be known as the Vaughn runabout, and will have 38 inch wheels, fitted with 2 inch solid tires. The engine will be of the two cylinder, 20 horse power. Beaver type, while the Vaughn friction transmission will be used.

## Transcontinental Dash Has Fatal Ending.

A car which started from Philadelphia at noon on Saturday on a transcontinental trip for the Philadelphia *Press*, carrying a messenger who was to deliver a message from President Taft to the president of the Alaska-Yukon Exposition at Seattle, was wrecked at 3 o'clock in the afternoon near Reading, Pa., and the courier, Henry L. Buckley, was mortally injured, and died later in the Reading Hospital. Other passengers of the car were more or less injured, and the trip was immediately called off. It appears that the car got beyond the control of the driver, and collided with a telegraph pole.

#### Lipman to Manufacture Cars.

Carl E. L. Lipman, of Beloit, Wis., who has been engaged in the manufacture of automobile parts, particularly circulation pumps and speed indicators, for many years, is at present constructing a six cylinder, 35 horse power car, to sell at \$1,500. The car has a very long wheel base and 34 inch wheels. Mr. Lipman is at present looking for a suitable location for a factory.

#### Business Trouble.

An involuntary petition in bankruptcy was filed September 9 in the United States District Court against the Kelsey Company, Inc., manufacturers and dealers in automobile and bicycle supplies, 45 Niagara street, Buffalo, N. Y., by Wm. E. Kelsey and others. Kelsey presented a claim for \$3,555.52 on a note, and other petitioners presented claims for amounts on open accounts. It is charged that the alleged bankrupt expressed its willingness to be adjudged a bankrupt, and admitted its inability to pay its debts.

Bids for Ohio Tags.

Bids for furnishing the Ohio State automobile department with 35,000 sets of tags for the year 1910 were opened by the Secretary of State September 15. Five bids were submitted, all of which were under the price for the present year, 50 cents a set. Samples of the tags will be furnished by each bidder, and these will be given a thorough physical and chemical test by Professor Edward Orton, of the ceramics department of the Ohio State University.

When translators not versed in technical matters are asked to make translations of letters, etc., containing technical terms exceedingly queer expressions are sometimes coined. The Marine Review reports a case where a Syrian interpreter in translating a letter in Arabic to a Manchester firm made use of the term "water sheep," which was finally made out to be an hydraulic ram. The Arabs, in adopting a name for this modern mechanical appliance, evidently followed the lead of the French, who call a ram a "mouton." An Italian translator of an article on gasoline motors spoke of the crank shaft as the elbow tree.

Garage Notes.

The Packard Motor Car Co. has recently opened a branch in Hartford, Conn., on Allyn street.

The Washington Boulevard Garage, 41-3 Washington Boulevard, Detroit, Mich., has been opened for business.

W. J. Courtney and W. N. Wesn, Newhampton, Ia., have purchased the Putney livery property, which they will remodel into a garage.

The Horton Motor Co., who have stores at Minneapolis, Minn., and Mayville, N. Dak., are building a garage in Devil's Lake, N. Dak.

Ramsthel Brothers, Grand Island, Neb., will shortly open a garage in the Donner Building, which has recently been purchased by H. L. Hayden,

A three story cement block garage building is to be erected on the Schriver property on North Perry street, Johnstown, N. Y. Work on the building may begin this fall.

The R. G. Dobbins estate, Philadelphia, are erecting a garage building at 253-9 North Broad street, at a cost of \$28,000. Work on the building was started September 15.

Guy Bailey has purchased the interest of his uncle, E. C. Bailey, in the Bailey Garage in Grundy, Ia. Young Mr. Bailey has been connected with the business for some time.

The Studebaker Automobile Sales Co., Columbus, Ohio, has leased a new building at North Fourth and Chestnut streets, in which it will conduct a garage and agency. A. J. Pray is general manager.

Mayor Wm. F. Brooks, of West Somerville, Mass., is erecting a 150x55 feet garage on the site of the historic Porter's Hotel on Massachusetts avenue, North Cambridge, which has been torn down.

Leece & Watterson, Bishop, Cal., have erected a corrugated iron garage in the rear of their store for their commercial vehicles. The building will also serve as a salesroom for gas engines and pumps.

F. B. Henderson, of New York city, will erect a garage on Cheyenne street, between Fifteenth and Sixteenth streets, Denver, Col. The building will cost \$25,000, and will have a warehouse and salesroom.

The Metropolitan Motor Car Co., Seattle, Wash., will erect a one story concrete garage building, 70x100 feet. Bruce A. Griggs is manager of the company, which has the agency for the Acme and Pullman cars.

L. B. Vollmer, Monrovia, Cal., has installed a charging plant in R. B. Cowan's garage on Lemon avenue, and will open as an electric garage on October 1. Mr. Vollmer handles the Detroit electric and the Columbus electric.

H. Schaffer, of Fullerton, Cal., is heading a company of Santa Paula, Cal., capitalists which has purchased the California Hardware and Tool Co.'s shops and will remodel the same into an automobile and oil tool repair shop.

E. W. Alfriend. Atlanta, Ga., is planning to erect a new building on Peachtree street, with a front of white enameled brick and plate glass, two or more stories in height, the first story of which will be used as an automobile salesroom.

Carl Jones and Louis Indra, Green Bay, Wis., have opened a garage on North Broadway under the style of the West Side Garage. Mr. Jones was formerly manager of the Kruger Garage at Oshkosh. The new company intends to handle several lines of cars.

The Empire Motor Car Co. has been organized in Syracuse, N. Y., and has secured headquarters at 244 West Genesce street. The company will handle Regal cars in eighteen counties of central New York, and are introducing them to the public by exhibiting at the New York State Fair this week. Geo. D. Wilcox is manager of the new company.

The Rambler Automobile Co., Cleveland, Ohio, has taken a lease of a new building to be erected on Sixty-fifth street and Euclid avenue. The building, which is to be completed by February 1, is to have ground dimensions of 60x100 feet. The front portion of the first floor, 60x60 feet, will be used as a showroom, and will have a polished

maple floor and frescoed walls. Geo. S. Patterson is manager of the company.

The Reading (Pa.) Automobile Co. have established a branch store in Pottsville, Pa., at 202 South Centre street, which premises they have leased for a number of years. The company handle Buick and Franklin cars. H. O. Koller, of the Reading Automobile Co., will manage the branch, which is to be known as the Pottsville Motor Car Co.

The Kenny Motor Car Co., which has just secured the agency for Rambler cars in Brooklyn, New York, and vicinity, has purchased a corner property at Sterling place and Bedford avenue, Brooklyn, where a modern building, including a garage and a storeroom, will be erected immediately. The members of the firm, Wm. F. and T. A. Kenny, are well known Brooklyn business men.

New Incorporations.

Fry & McGill Motor Supply Co., Denver, Col.— Capital stock, \$100,000. Incorporators, John E. Fry and James McGill.

Lloyd Automobile Co., Portland, Ore.—Capital stock, \$40,000. Incorporators, W. E. Cook, C. B. Lloyd and L. Templeton.

Western Garage, Marysville, Cal.—Capital stock, \$10,000. Incorporators, J. E. Coombs, W. G. Humphrey and H. B. P. Gardiner.

Evansville Taxicab Co., Evansville, Ind.—Capital stock, \$10,000. Incorporators, Gustav Zeidler, J. F. Charley and A. O. Harnishfeger.

Miller Motor Co., New York, N. Y.—Capital stock, \$30,000. Incorporators, Chas. Miller, Lawrence H. Cummings, Geo. W. Schaefer.

Dahl Punctureless Tire Co., Minneapolis, Minn.

—Capital stock, \$50,000. Incorporators, A. N.

Dahl, Benj, Dahl and F. H. Stevens.

The Taxicab Co., Cleveland, Ohio.—Capital stock, \$10,000. Incorporators, Moses R. Braily, F. E. Braily, C. B. Gaw and R. M. Gaw.

The Red Ball Automobile Co., Enid, Okla.— Capital stock, \$10,000. Incorporators, W. H. Hill, Geo. J. Emrick and Orie J. Wilkinson.

Wright-Rye Motor Co., Troy. N. Y.—Capital stock, \$40,000. Incorporators, Wm. D. K. Wright, Wm. H. Rye and George A. Hubbard.

Maxwell-Briscoe-Toledo Co., Jersey City, N. J.— Capital stock, \$2,000. Incorporators, S. A. Anderson, L. H. Gunther and H. O. Coughlan.

Anti-Friction Wheel Company, Pittsburg, Pa.—Capital stock, \$150,000. Incorporators, Thos. Bernston, Geo. D. Williams and Geo. L. Lothamer. Connersville Auto Supply Co., Connersville, Ind.—Capital stock, \$4,000. Incorporators, A. E. Goble, Alva Adams, Ray Thornburg and John Keucht.

Mosher Automobile Co., Anderson, Ind.—Capital stock, \$6,000. Incorporators, A. T. Mosher, J. E. Van Deventer, J. L. Vermillion and E. E. Young.

The St. Paul Motor Vehicle Co., St. Paul, Minn. —Capital stock, \$100,000. Incorporators, John Vieregge, Alma Vieregge, Felix Joswich and Jessie Joswich.

The National Automobile Co., Cincinnati, Ohio.—Capital stock, \$50,000. Incorporators, D. Linn, Abraham Tuttleman, E. M. Harris, J. L. Kohl and Edward E. Keeney.

The Acorn Motor Car Co., Cincinnati, Ohio.— Capital stock, \$20,000. Incorporators, Henry Louhier, Wm. C. Meyer, Emilie M. Maitre, B. F. Bryan, William Elwood.

The Ohio Electric Co., Toledo, O.—Capital stock, \$75,000. Incorporators, Henry P. Dodge, Rathbun Fuller, Henry E. Marvin, James Brown Bell and Robert R. Lee.

The Bergen and West Side Motor Car Co., Jersey City, N. J.—Capital stock, \$100,000. Incorporators, Chas. E. and Martha L. Collard, and Beverly D. Sparks. (To carry on a general garage business.)

The Euclid Automobile Co., Cleveland, Ohio.— Capital stock, \$25,000. Incorporators, John H. Watson, Jr., W. D. Turner, N. J. Webster, R. E. Robinson and J. C. Reforth.

The Toledo-Mitchell Co., Toledo, Ohio.—Capital stock, \$10,000. Incorporators, J. J. Vollmayer, Fredk. C. Schaal, Samuel McIntyre, William A.

Cavanaugh, William C. Vollmayer and W. H. McIntyre.

Petrie Auto Co., St. Louis, Mo.—Capital stock, \$10,000. Incorporators, C. G. Petrie, T. D. Petrie, F. M. Curlee, Roy Britton and A. D. Brown.

East St. Louis Automobile Co., East St. Louis, III.—Capital stock, \$2,500. Incorporators, M. L. Harris, Carl C. Housmann and J. R. McMurdo. Victoria Motor Car Co. Minneapolis, Minn.—

Victoria Motor Car Co., Minneapolis, Minn.— Capital stock, \$50,000. Incorporators, C. H. Robinson, A. W. Armatage, R. H. Rose, J. W. Hohman.

St. Paul Motor Vehicle Co., St. Paul, Minn.— Capital stock, \$100,000. Incorporators, J. A. Vieregge, Alma Vieregge, Felix Joswich and Jessie Joswich.

Ideal Auto Starter Co., Indianapolis, Ind.—Capital stock, \$25,000. Incorporators, W. K. Bellis, R. T. Snapp, S. A. Woodard, N. D. Woodarl and R. L. Smith.

The Franklin Motor Car Co., Columbus, Ohio,—Capital stock, \$10,000. Incorporators, F. H. Lawell, R. M. Todd, G. S. Ferguson, M. L. Welch and H. L. Clevenger.

Indiana Auto Parts Co., Marion, Ind.—Capital stock, \$75,000. Incorporators, G. R. Stewart. Richard Ruddell, H. D. Reasoner, F. C. Stephenson and J. D. Kennedy.

#### Trade Personals.

E. R. Lausier has been appointed assistant manager of sales of the Timken Detroit Axle Co., Detroit, Mich., and the Timken Rouer Bearing Co., Canton, Ohio.

W. F. Reynolds, who has been Texas representative for the Franklin Manufacturing Company, has been made manager of their new branch house at Pittsburg.

J. S. Draper, sales manager of the Mora Motor Car Co., of Newark, N. Y., is at present in Atlanta, Ga., with the object of establishing an agency for Mora cars there.

Carl A. Broesel, sales manager of the Simplex Automobile Co., of New York, was in St. Louis last week, with the object of establishing an agency for the Simplex car there.

R. G. Stanton, formerly with the H. O. Harrison Co., of Los Angeles, Cal., has been appointed sales manager of the Oldsmobile branch of the Woolwine Motor Car Co., of the same city.

The Pope Manufacturing Co., of Hartford, Conn., inform us that their engineer, L. B. Hubbell, has not resigned, as was stated in our last week's issue. The report originally appeared in a Wilkes-Barre paper.

H. J. Snider, who recently entered the employ

H. J. Snider, who recently entered the employ of the H. H. Franklin Manufacturing Co. as assistant to one of their office department managers, has been appointed manager of the Albany branch of the Franklin Automobile Co.

C. B. Warren, Pacific Coast representative of the F. B. Stearns Co., Cleveland, Ohio, has resigned his post to enter business for himself in St. Paul, Minn. He will be associated with Burney Bird in handling the Maxwell and several other cars.

Claude E. Cox has resigned his position as engineer and assistant manager of the Interstate Automobile Co., of Anderson, Ind., and has assumed a similar position with the Wilcox Motor Car Co., of Minneapolis.

At a meeting of the board of directors of the Oakland Motor Car Co., Pontiac, Mich., held on September 14, to elect a successor to the late E. M. Murphy, former general manager, L. L. Dunlap, factory manager of the plant, was appointed.

#### New Agencies.

Atlanta, Ga.—A. J. Haas, Winton.
San José, Cal.—W. T. Warren, Renault.
Philadelphia, Pa.—Frink & Co., Kline Kar.
Hartford, Conn.—Brown, Thomson & Co., Loier.

Philadelphia, Pa.- Longstreet Motor Car Co.,

Waltham, Mass.—Waltham Automobile Co., Winton Six, Stevens-Duryea, Overland, Marion, Stoddard-Dayton, Winton Model K, Regal and Speedwell.

# The Horseless Age

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#### The Second Annual Good Roads Convention.

CLEVELAND, Ohio, September 23.—The farmer and the automobilist joined hands at the second national good roads convention held in Cleveland September 21-23. The public highways are the primary means of transportation, all delegates to the convention agreed. Before the railroads there were highways. Since the building of the railroads there have been highways, although until very recently the city resident has appeared ignorant of the fact.

The railroads worked the first great change in the highways of the country—a change for the worse, according to George S. Ladd, special good roads lecturer of the National Grange, who addressed the convention Tuesday morning. The city resident almost forgot that there was such a thing as a country road; while the farmer, left alone to struggle with mud and dust, hole and rut, accepted bad roads as a necessary evil.

Then at length came the automobile, and the second great change in the highways of the country is being worked—a change for the better. The automobile, according to National Grange Lecturer Ladd, at first considered in rural communities as an intruder and a nuisance, is now credited by the thinking class of farmers as the source of the good roads movement. The farmer and the city man again are able to meet upon a common ground. Good roads are as much demanded by the one as the other. On the one hand the vision of the farmer has been broadened. He realizes today, as never before, the advantages of community life, the benefits of organization, of communication with his brother farmers and with the outside world, the need of centralized schools for his children, the advantage of easy access to his market. All these things he knows depend upon good

On the other hand the city resident, the manufacturer, the professional man, the merchant, is turning to the hills and the plains for his recreation and pleasure and for his health. He is finding a summer home next door to the farmhouse. And he, too, desires good roads. "Just how great a part the automobile has played in this united effort of the farmer and the city resident in behalf of good roads it is difficult to state," said National Grange Lecturer Ladd. "We can only say that until the day of the automobile the city resident was not concerned about country roads. He had turned the whole problem over to the farmer and then forgot that it existed. And

the farmer, before the automobile went spinning through his farm, didn't realize how far he was from his neighbors, how isolated was his life."

#### DOMINANT INFLUENCES.

The two dominant influences in the second national good roads convention were the American Automobile Association, representing the autoists and the cities, and the National Grange, representing the farmers. Co-operating with these organizations were the American Road Makers' Association, the National Association of Automobile Manufacturers, the Association of Licensed Automobile Manufacturers and the American Motor Car Manufacturers' Association. The Federal Government was represented by Logan W. Page, director of the United States Public Roads Office; while officially accredited delegates from forty-two States were in attendance.

"What we hope to accomplish by this national good roads convention," said Lewis R. Speare, of Boston, president of the American Automobile Association, before introducing George C. Diehl, of Buffalo, as chairman of the convention, "is the cooperation of State and Federal governments, of automobilists and automobile manufacturer, of farmer and city resident, that, working together, we may effect the improvement of our highways, the construction of new and the maintenance of

old, along some broad general plan calculated to bring the greatest good to the greatest number."

#### STATE AID AND CONTROL.

The sentiment of the convention was well defined in favor of centralized control by the various States of all highways within their borders and of the policy of annual appropriation known as "State aid" pursued by a majority of the Eastern States. National aid played but little part in the discussions. It was agreed that until the States were thoroughly aroused national aid in the good roads movement was beyond hope.

The three days of the convention were devoted to the reading and discussion of a series of papers, the list of speakers including the foremost men in the fight for better roads-men of the authority of Logan W. Page, of the United States Public Roads Office; ex-Governor N. J. Bachelder, of New Hampshire, Master of the National Grange; J. H. McDonald, State Highway Commissioner of Cennecticut; James C. Wonders, State Highway Commissioner of Ohio; S. Percy Hooker, State Highway Commissioner of New York; George S. Ladd, special good roads lecturer of the National Grange; T. C. Laylin, master of the Ohio State Grange, and F. N. Godfrey, master of the New York State Grange.

#### POINTS OF POLICY.

Direct State control of the construction and maintenance of all public highways, the



SPREADING THE CRUSHED STONE FILLER—THE TOP COURSE.

creation of the office of State highway commissioner in every State in the Union, the expenditure by this commissioner of all State aid road funds, the adoption by each State of a definite policy of trunk line roads, greater co-operation between the States, a reduction of the cost of road work so as to make improvement appeal to the farmer -these were the features, with but few exceptions, of all addresses and discussions. The futility of State appropriations to be used by local county officials in road improvement was generally conceded. This plan has been abandoned in most of the Eastern States, and it is there, the speakers asserted, that the good roads movement has reached its highest efficiency and greatest accomplishment.

The local system still prevails in Ohio, but was freely censured by the Ohio commissioner. James C. Wonders. "Ohio should not continue building State aid roadsin the indiscriminate manner pursued under the present law," said Commissioner Wonders. "Main market highways should be so selected that the roads of one county would connect with those of another, giving continuous highways that connect all important towns of the State. Furthermore, most of the State money now appropriated for new roads is spent by the counties in maintenance of the old. Though the counties are supposed to maintain existing roads at their own expense, almost without exception they have used the State aid funds for this purpose. I hope to secure at the next session of the Legislature the passage of a law making it illegal for the counties to expend State aid funds in any other work than the construction of new roads. In this way only will the mileage of the highways of Ohio ever be increased."

MILEAGE AND COST OF ROADS.

The most comprehensive address of the

convention was that delivered by Logan W. Page, of the United States Public Office of Roads, "In mileage we have the most tremendous system of roads which any country has ever possessed since the world began," said Mr. Page. "According to a careful road census, the length of all of our roads amounts to 2,155,000 miles. The most liberal estimate of our annual expenditure for these roads, both in money and in labor, was a fraction over \$70,000,000 in 1904. or about \$1.05 per capita. According to our road census, we have less than 40,000 miles of stone surface road, or about 2 per cent. of the total mileage. We have 108,000 miles of gravel road, or about 5 per cent. of the total mileage. Small as our annual expenditure for roads has been, it has aggregated, during the thirty year period from 1870 to 1900, a total of upward of \$1,800,000,000. We may, therefore, say that road building in the United States is, area, population and wealth considered, at the same point at which it stood thirty years ago, and the \$1,800,000,000 expended have produced few appreciable results."

Mr. Page then dwelt upon the necessity for good roads. "We need and must have more money for roads, definite provision for maintenance, a system of continuous repair and a centralized supervision," he said. "When we turn to the subject of road administration in the United States," Mr. Page continued, "we find that about half of the States are operating under practically the same road laws as prevailed in England when America was a colony. This system of road administration provides for the payment of road taxes partly in labor, and localizes the work to an extreme degree by placing in authority the district or township overseers, no requirement being made to secure skill or knowledge of road building on the part of these petty officials. This is

the system which prevailed in all the States until less than twenty years ago. It is, therefore, easily understood why at the present time the concrete results in the matter of road building are so few, are confined to a comparatively recent period and are found in those States which have broken away from the inadequate and ineffective system which I have just described.

ROAD ADMINISTRATION,

"Road administration has either been placed on a sound and practical basis, or steps have been taken in that direction in about half of the States of the Union, comprising the New England States, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, West Virginia, Ohio, Michigan, Illinois, Wisconsin, Minnesota, Missouri, Kansas, California and Washington. These States have adopted in principle or practice, or both, the system of centralizing under a State highway department the conduct of all or part of the road work of the State, thereby securing uniformity in methods, economy in administration and skill in supervision,

"In some of the States' highway departments the work is educational and investigative, with a view of ultimately giving these departments administrative powers. Some of the States, notably Kansas, Missouri and West Virginia, have provided for skilled supervision in the counties through the appointment of county highway engineers. In most of the States appropriations have been made from the State treasuries, or the aid of the State convict force has been given toward carrying on road work throughout the various counties.

"Be it said that the principle of State aid and supervision constitutes the germ of the only road administration which has proved successful. This movement is gaining headway at a very rapid rate, and, when we consider that it has been little more than a decade and a half since its inception, the fact that half of the States have adopted it in principle and have actually expended from State treasuries considerably over \$56,000,000, we may feel encouraged for the future of road building in this country."

EUROPEAN ADMINISTRATION SYSTEMS.

Mr. Page then outlined the various systems of road administration employed in the countries of Europe.

"In France we find the administration of roads highly centralized," said Mr. Page. "There are in France at the present time 23,656 miles of national routes, which cost \$303.975,000 to build. There are 310,898 miles of local highway built at a cost of \$308,800,000, of which sum the State furnished \$81,060,000 and the interested localities \$227,740,000." Speaking of England. Mr. Page said: "There are 149,759 miles of road in England, for which the annual expenditure for the year 1905-1906 amount ed to \$78,059,000. It is, therefore, apparent that the annual expenditure per mile amounts to about \$520. In view of the fact that most of the principal roads of Eng-



APPLYING ONE OF THE PATENT DRESSINGS. CARBO VIO.

land have already been constructed, this large annual expenditure would appear to be devoted in a large measure to maintenance. It would seem that a system which requires an annual outlay of \$520 per mile for the entire mileage must be ineffective and costly. The explanation of this is found perhaps in the fact that in England the maintenance of the public highways devolves entirely on the local authorities, these numbering about 1,000. The English system lacks strong central control, there being four different units of Government control-the county boroughs, the urban districts, the rural districts and the rural parishes.

"In Germany we find a federation of states," Mr. Page continued. "It follows that road administration is conducted separetly by each state of the Empire. The Imperial Government exercises very little control over the highways, and does not in any way contribute to the expense of their construction and maintenance.'

#### FAVORS CENTRALIZED STATE CONTROL.

From his study of the road systems of Europe Mr. Page draws an unqualified conclusion in favor of centralized State control. "England is the most striking example of extreme localization," he said. "And it is a significant fact that England is also the most striking example of lack of uniformity in road work and of excessive expenditure in proportion to mileage. It is also a significant fact that the most perfect road system, conceded to be such by all authorities on highway construction, is that of France, admittedly the most highly centralized of all the road systems. France, with a total mileage of about two and one-third times that of England, expends about the same amount annually for maintenance. Certainly the inference must be plain that centralization makes for economy and efficiency in the administration of the public

#### COSTLY MAINTENANCE.

"Road maintenance is the most important good roads question engaging the attention of American road builders and legislators," Mr. Page declared. "In the years that have passed," he said, "by far the largest portion of our annual expenditures has been made for maintenance, a maintenance which may be justly considered a mockery, for it has been a maintenance of the roads in almost their primitive condition. Now that we are actually building roads which compare favorably with the best of Europe, it is of the gravest importance that we make provision for safeguarding and maintaining these roads built at so great an expense.

"In a careful study of the highway laws which have been enacted within the past fifteen years I find almost no provision for the maintenance of the roads, although large sums are authorized for construction. The erroneous impression generally prevails that when a so called permanent road is constructed it is built for all time, and the expense has practically all been met. I have



A SECTION OF THE FINISHED ROAD. DARK LINE IS DIVIDING LINE BETWEEN TWO SECTIONS.

investigated the cost of maintaining roads in the leading countries of Europe, and the figures may almost be said to be a revelation. These express most forcibly two facts -that even the best of improved highways are not self maintaining, and that the cost of maintenance varies tremendously with the degree of centralization of the administrative organization which has the roads in

"Many of our States have spent and are spending large sums of money on their highways with but little thought or provision for maintenance. This, if the experience of European countries is of any value. must prove disastrous in two ways: First, granting that the roads constructed at so great a cost will not be allowed to go entirely to ruin, the cost of maintenance will be higher the more local and loosely centralized the organization for maintenance; second, systems of intermittent maintenance are sure to increase in cost from year to year as they have in Europe.

"It is high time that our legislators take note of these facts and provide ways and means so that our roads, once constructed, can be maintained efficiently and economically, and that exorbitant sums need not be expended on fruitless efforts to maintain them unsystematically and in an unscientific manner."

NEW YORK STATE COMMISSIONER'S VIEWS.

Although Mr. Page's address was generally approved, it met with opposition from at least one delegate, S. Percy Hooker, chairman of the State Highway Commission of New York. "It is a fallacy that all highways should be built directly by the State," said Commissioner Hooker. "This idea in New York State, at least, is not borne out by the facts. There the best of results have been obtained with the roads built and maintained by local officials, backed by State advice and funds." Commissioner Hooker also opposed the trunk line plan, contending that in New York better results have been secured by connecting populous centres without specific intention to complete a through State trunk line.

#### IMPORTANCE TO FARMERS.

To convince the farmer that the good roads movement was not entirely in the interest of the automobile owner was unanimously declared to be a pre-eminent necessitv.

James H. McDonald, State Highway Commissioner of Connecticut, voiced the sentiment of the convention when he declared that the roads of this country are its greatest public service corporation. The farmer here and there is blind to this fact, though to him it is most vital.

"The farm and city alike, the people of this country in general, do not appreciate the importance of this great question of good roads," said Commissioner McDonald. "The railroads have not settled the question of transportation. The farmer is still back there in the rural community, far removed from any railroad. The solution of the highway question lies in State aid and State supervision. But I would impress on this convention and upon this country that State aid and State supervision is not a political hatrack. It is not an eleemosynary institution. It is not a ladder to allow any man to climb to the height of his ambition. It is not an emergency hospital for the financially crippled. It is simply and solely a means to secure uninterrupted highways throughout the State and the Union. It must be so presented to the farmer, to whom in the last analysis we must turn for the furtherance of the good reads movement."

#### ATTITUDE OF OHIO GRANGE.

Speaking for the Ohio Grange, T. C. Laylin, master, said: "While we of the Grange may at times have differed with our city friends as to the best methods of raising



A SECTION OF THE ROAD BEING ROLLED

and expending the good roads fund, there has been no question of our attitude favoring the rapid improvement of the entire road mileage of this State. Unfortunately, however, there are thousands of farmers not allied with our organization. There is still urgent need of missionary work in rural communities on behalf of better highways.

"Good roads mean much to the farmer's comfort. He should be made to understand the variety of benefits which will flow from highway improvement. Good roads will result in centralized and better schools for the farmer's children, in an advantageous social and business organization of his community, in better communication of farmer with farmer and with the outside world, and, ultimately, I believe, in that greatest need of the farmers-the parcels post. These are the things pointed out some time ago by Theodore Roosevelt as necessary if the farmer is to remain on the farm. While there is no immediate danger of the failure of this country's food supply, there is such future danger unless the tide in the direction of the city is turned. Unless farm life can be made attractive America one of these days will be forced to import much of its food supply."

#### CONNECTING THUNK LINES.

George S. Ladd, National Grange lecturer, speaking upon the New England plan for connecting lines of trunk highways, said: "The New England plan of State co-operation in obtaining a system of connecting trunk lines of improved highways was evolved in a convention of State officials representing the six States. The plan determined upon has been faithfully followed. The result is speedily becoming apparent in a connected trunk line system unapproached anywhere else on the continent. Today we have available \$4,000,000 for the further prosecution of this work."

A feature of the convention was an exhibition of road building machinery and materials.

#### RESOLUTIONS ADOPTED.

Following the adoption of resolutions, in which the representatives of the National Grange, the American Automobile Association and the American Road Makers' Association pledged themselves in behalf of their respective organizations to enlist the cooperation of each of their constituent and affiliated bodies in highway improvement both by Federal and State aid, the convention adjourned Thursday noon to meet in 1910 in St. Louis.

"The convention has proved a complete success, especially from the educational standpoint," said President Lewis R. Speare, of the American Automobile Association. "Never in the history of the country has the subject of public highways received a more expert and scholarly treatment. The attendance also has been gratifying. The registration of delegates was 50 per cent. higher than last year in Buffalo."

The joy rider was given a rap at the last moment, when the convention resolved to request the aid of all law abiding automobilists in the enforcement of just speed regulations and in the apprehension of "the comparatively few offenders who are deaf to persuasion and persistent in disregarding the rights of their fellow occupants of the road."

Township, county and State officials, where empowered, were called upon to see that all roads are properly marked, and, where such authority does not exist, were urged to obtain the necessary legislation. The convention placed itself on record as favoring the Currier good roads bill, now pending in Congress.

#### NATIONAL COMMITTEE,

Following is the national committee, as named Thursday, to be in charge of the convention next year at St. Louis; George C. Diehl, Buffalo, chairman of the good roads board of the American Automobile Association; N. J. Bachelder, Concord, N.

H., master of the National Grange; James H. McDonald, Hartford, Conn., president of the American Road Makers' Association: Logan W. Page, Washington, D. C., directof the United States Office of Public Roads; C. F. Clarkson, of the Association of Licensed Automobile Manufacturers; S. D. Waldon, Detroit, president of the National Association of Automobile Manufacturers: Alfred Reeves, New York, general manager of the American Motor Car Manufacturers' Association; R. W. Smith, president of the Colorado State Automobile Association; S. D. Capan, president of the St. Louis Automobile Association; Louis R. Speare, Boston, president of the American Automobile Association; J. T. Drought, Milwaukee, secretary of the Wisconsin State Automobile Association, and F. H. Elliott, New York, secretary of the American Automobile Association

The accompanying photographs were taken on the experimental road near Columbus, Ohio, which was the subject of an article in our issue of September 15.

#### After the Cars Are Sold. By F. E. WATTS.

After a car passes from the hands of the agent to the user the factory's interest in it should by no means cease, for it has entered upon the work to prepare for which all the care in manufacturing and testing was expended. It is busily making a reputation for the company, and the company's interests demand that they know whether that reputation is good or bad.

Two departments are especially interested in the performance of the cars in the hands of their users, viz., the sales department and the designing department. The sales department needs to know just how far the cars are "making good," so that they may perfect the details for the next season's campaign. The designing department should keep in close touch with the cars so that faults may be remedied in future models, and so that each detail of the performance will be available as the basis of future designs.

As the men employed in these two departments are likely to change, this information should be recorded in such form as to be readily available to newcomers. Comparatively few companies have developed any systematic method of doing this, but I believe that the few who have considered the work almost indispensable.

Three sources of information at once present themselves when this subject is considered, namely, agents, users and the records of repair parts furnished. The first and the last are most commonly taken advantage of, while the users' troubles are ordinarily taken up in an unsystematic manner as they are told in a more or less coherent fashion by letters. Some manufacturers employ a force of "trouble men" whom they keep on the road most of the time, looking into faults and alleged faults making minor adjustments, keeping the cars

in tune, and the owners in good humor, all of which adds greatly to the reputation of the car they represent. In other factories this work is done in a half hearted manner, and only when an especially aggravating case makes it imperative. If a company has trouble men on the road it is comparatively easy to get detailed reports from a good many owners. Otherwise this must be done largely by mail.

Many companies do not take the trouble to get lists of the owners of their cars, but there are other makers who find it profitable to have their agents furnish them such lists at stated intervals. They can then use these lists when sending out information regarding new models, improvements applicable to old models, and new accessories.

Information regarding the performance of cars may be obtained by sending blanks to agents or users at regular periods. Such blanks may have headings somewhat as follows:

INFORMATION REGARDING THE CONDITION OF .....

Model..... Number.....

(Please record any breakage, looseness or other indications of undue wear in any of the following parts. Give details in full. Mention parts by serial number if you have repair list.)

Engine.

Radiator.

Clutch.

Change Gear,

Universal Joints and Driving Shaft.

Rear Axle.

Front Axle.

Springs.

Frame.

Bod▼.

Steering.

Brakes.

Control.

Wheels.

Tires (mention make).

General. (Under this heading note undue noise, appearance and ease of riding, and power as compared with when new.)

If the records of the repair stockroom are properly kept they form an invaluable list of the length of service a part gives. In some factories a copy of every repair part furnished is sent to the engineering department. These slips are classified so as to form a complete record of the percentage of repairs furnished on every piece. When a certain percentage of replacements is exceeded the part which is giving trouble is carefully examined for faults in design, manufacture or material.

These repair stockroom reports alone form an excellent basis for a system for keeping track of the performance of cars. When they are taken in conjunction with outside reports as detailed information as is required may usually be obtained.

Of course the method must be adjusted to the number of cars produced, and the price obtained per car. Obviously much less attention can be paid to the performance of each car by a company making 10,000 cars a year, and selling them for \$700 each, than by a company with an annual output of 100 cars, which retail at \$5,000 each.

#### That Costly Back Counter Boring. By G. E. P.

There is probably no more costly machine operation than back counter boring, which is a very slow operation and eats up time. A man may be making good time on a piece of work, but if the work requires a back counter boring operation, his effort does not show so well after it.

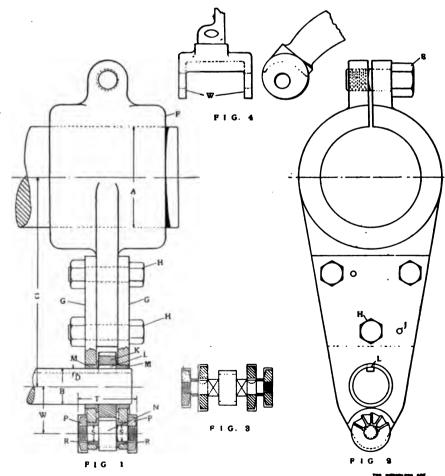
A sketch is herewith shown of a tool which I have used with great success, and, although it may not be entirely new to some of the readers of this paper, it will, no doubt, help a great many out of trouble. I have used this tool for straddle milling, as shown by the sketch, Fig. 3.

Fig. 1 shows the tool above mentioned, and a little explanation ought to make its construction clear. This tool was designed to be used on a plain milling ma-

chine with overhanging arm, the fixture being fitted to the arms at A and also at B, the arbor B fitting the spindle.

We have the usual spline D in B which when we loosen the hexagonal head cap screw E, Fig. 2, can be adjusted to suit the work. The body of the fixture F is made from a machine steel forging. Two plates of tool steel are fastened to F by the hexagonal head cap screw H and dowel pins J (Figs. I and 2), after the other parts have been assembled. The gear K is made of machine steel and is driven from B by a key L. Tool steel bushings are forced into the plates Q and are hardened and ground to a nice running fit on B.

Gear N meshes with gear K and the hub integral with N on either side is threaded to receive the cutters P. One thread is left hand and one is right hand. The part N is made of machine steel. The bushings R are of tool steel and are hardened and ground to fit N at S. The milling cutters P are made of a good grade of tool steel, and, of course, the diameter and the width T are made to suit the work. You are limited to the diameter of the cutters by whatever you make B and W. This fixture is very inexpensive when the amount of time it saves is considered. Fig. 4 is a sketch of one of the pieces for which this fixture was designed. The pieces alone paid for the fixture.



Tool for Milling Spring Horns, Etc.

## The Effect of Spark Timing on Engine Power as Shown by the Manograph.

By W. A. STILES.

It is a fact not generally recognized that nine out of ten cars are driven at all times with a decidedly low spark. This is due partly to the fact that it is difficult to tell just when the spark is timed exactly right, and partly because the speed of the engine is constantly changing, and drivers find that much less attention is required when the mixture is exploded late enough at moderately high speeds, so that no change is necessary should the engine slow up a little at times. It is often the case, too, that after two or three years' service the mechanism or couplings which drive an ignition system become badly worn, and the "backlash" represents the exact amount that the spark has been retarded; but the driver, having become used to setting the spark lever at a certain place, continues this practice without realizing that the engine should really be retimed. Often we will find a magneto being driven through a coupling, an oil pump, then another coupling and a set of gears, and the aggregate wear of all these parts in two years' service is surprising, although not when one considers that approximately one-tenth to one-fifteenth of a horse power is being driven constantly through this train.

#### EVILS OF LATE SPARK.

The evils of a late spark, or some of them at least, are well understood by the majority of car owners. Cracked cylinders, warped valves and boiled out radiators are all the direct result of the terrific blast of flame which tears out of the exhaust when the firing is retarded for too long a time. In fact, an air cooled car will not perform its duties unless the spark is advanced almost to the limit. But there is one other result which, although recognized, is not understood so well as these others, namely, loss of engine power. A dynamometer test will, of course, make any change of timing apparent at once, but the manograph will make it so obvious that one will at once realize the recessity of a spark which is timed just .ight.

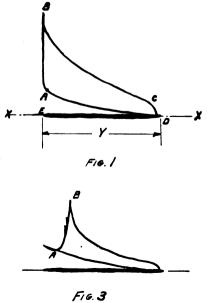
To follow this discussion further it is necessary that the use of the manograph card be understood, together with an appreciation of the meaning of the various curves and lines shown on it. Without going into a description of how the car is produced, then, we will consider the card shown in Fig. 1. In this figure the point A represents the point of explosion, B the peak of pressure which is instantly reached on explosion, B to C the line of work or expansion, C being the point of exhaust valve opening, D to E being the expulsion stroke. and from E back to D on the lower line the suction stroke. X-X represents the atmospheric line, and the dimension Y is the length of the stroke. The area enclosed by the compression, explosion and work lines represent power, and as a matter of fact a

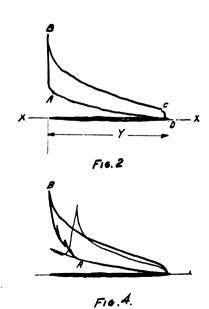
millimeter constant could be taken and the horse power developed at different times be figured. From this area, however, the area enclosed by the loop of the expulsion and suction strokes must be subtracted, as this latter is a dead loss. It will be noted that the spark is timed exactly right, for while it occurs a trifle before centre, yet by the time that the piston reaches dead high centre the combustion is just fairly under way. (This card was taken at 1,225 r. p. m.) A very high peak is obtained, and consequently a very large card area is shown, indicating a good power output. The compression curve is normal and does not show any overheating of gas, and the exhaust is chopped off fairly sharp and smoothly, this being a matter of exhaust valve setting.

In Fig. 2 we have another excellent card. which was taken under light load, and consequently the engine had less gas fed to it. It will be noticed that the explosion peak is much lower, and the expansion curve follows to some extent the curve formed by the compression and explosion, thus giving a thin card, showing that the engine is doing very little work. Fig. 3 shows us the beginning of a spark which is retarded quite decidedly. The compression line is brought up very normally to the high centre, but as the mixture is not exploded the curve travels back again almost in the same line. If the engine is new, with tight rings and running at a fairly high rate of speed, the return curve will either be exactly on the same path as it traveled coming forward, or a little above, due to the gas heating during the stroke. If, however, the engine speed be slow, and the rings or valves leaky, the back curve will drop somewhat below the forward one. It will be noticed that the line of combustion, when it does start, does not travel upward in a straight line, but is carried forward by the travel of

the piston. It indicates poor combustion. and the peak, besides not rising high, occurs too near the exhaust. This is an indication that trouble is at hand for the engine, and in Fig. 4 we see the results. of a spark carried late for too long a time. The firing point in this figure, instead of being considerably after centre, occurs when the piston is from one to two inches from top centre. The combustion line travels from the firing point in a ragged, broken line forward, as the piston has not yet finished its up stroke. The peak is low. due probably to leakage in the engine. The light line shown on the same card is the normal late firing line, which is imprinted on the manograph plate whenever the mixture does not explode prematurely. Often the engine will run on its late spark for fifteen minutes or so, and will then fire prematurely in quite regular fashion for a while, when it will shift back to the spark again. The premature firing is just about as hard on the engine as the late firing, as it knocks the bearings to pieces, strains the motor, and is apt to split a cylinder should the latter be at all weak.

There is one improvement the development of which has been badly neglected. I refer to the automatic spark governing advance. We have had automatic throttling governors of all sorts, but a governor which would be sufficiently sensitive to advance and retard the spark in exact proportion to the speed of the engine, and which would have the additional merits of being cheap and compact, would undoubtedly demand attention at the hands of the best motor designers of the country. Its first cost would be more than offset by the fact that there would be no advance lever, lever rod, universals or knuckle joints, and the fact that no hand manipulation is required would be a good selling point for a car, as well as a source of delight to its owner. It would certainly solve the problem of late timing, and eliminate many of its unpleasant results, and would probably increase the power of many motors.





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#### Road Building Experiments.

Road building is an old art, and may be considered to have practically reached finality when only roads suitable for ordinary horse traffic are considered, but it is a well known fact that the best macadam and Telford roads leave much to be desired from the standpoint of automobile traffic. Such roads when subjected to considerable heavy and fast automobile traffic deteriorate rapidly, and in dry weather so much dust is raised on them by fast automobiles that both road users and residents along the roads are greatly annoyed. It has already become generally recognized that automobile traffic requires special road construction. In this country we have as yet comparatively few improved highways, and it is therefore possible, as our road system is developed, to adapt the roads to the automobile, and it is not imperative that the automobile should be adapted to the roads, as is practically the case where a complete network of improved roads already exists. Of course it must not be understood that automobiles may be built absolutely without regard to their effect on the road surfaces. The best results will undoubtedly be

obtained, and the problem will be solved soonest if endeavors at adaptation are made on both sides; that is, if automobile designers endeavor to build cars having the least destructive effect on existing roads, and if road builders try to provide road surfaces which offer the greatest resistance to destruction by present day automobile traffic.

The authorities of the various States having charge of road construction seem to fully realize the importance of adapting the new roads to the new form of traffic. Treatments for effectively binding the filling material add considerable to the cost of road construction, but the fact is recognized that almost every main road now constructed will be used by automobilists to a large extent from the start, and that if the road is to last it must have the filling material and top dressing securely bound. The various processes of constructing dustproof roads are all quite new, and information as to their relative merits is quite scarce. Probably the best way to encourage invention in this line and to bring the meritorious processes to public notice consists in the construction of experimental roads, adjacent sections of which are built according to the different processes. This enables a good idea of the relative costs to be obtained, and the proximity of the different sections makes it easy to compare roads of the different types after different periods of use, such comparisons being particularly valuable because the weather and traffic conditions have been the same for all sections. The United States Government has built such experimental roads near Washington, D. C., and the States of Ohio and New York are carrying on similar experiments at the present time.

#### Twisting Stresses in Control Rods.

While the twisting stresses which rough roads impose upon the power plant and transmission elements of a car are pretty well recognized and their destructive effects provided against by universal joints, it is not always realized that other minor but not less important operative parts are subjected to stresses of this character and are not always safeguarded against the evil results arising therefrom

Control linkages, the rods of which extend from the chassis frame to various points upon the rear axle, are especially subjected to twisting, resulting from deflections of the axle out of the horizontal when the two rear wheels traverse paths of unequal contour.

Brake pull rods and the shifting rods of rear axle mounted change speed gears come under this head. The voke ends of the rods connecting the ends of the equalizer bar with the bell cranks of the mechanism at the rear hubs suffer a relative change of plane when one side of the axle is lifted or depressed more than the other. A twisting action is thus set up which is more severe in proportion as the rod is of short length. When this twisting action is complicated with the severe stresses arising from the front end of the rod being far out of line with the front end of the distance rod, the material of the rod and the rod ends is very severely tried. These stresses recur very rapidly when a car is driven at speed over rough roads, and may alternate in direction, and it is not unlikely that some disastrous failures of brake riggings have been due to the fatigue resulting from long continued stresses of the above described character. The breakages very frequently occur near the rod ends, where the material is presumably weakened by the cutting of the adjusting

It is of the very first importance that brake pull rods be relieved of all stresses save those imposed by legitimate operation, and the same is true of all other rods extending from the chassis to the constantly vibrating axles. Some makers are providing a universal joint in one end of each pull rod, which acts to prevent twisting stresses. Not only should a very liberal factor of safety be allowed in thse rods, but they should be anchored in front at points so located that they may fully follow the upward and downward movement of the axle along nearly the same arc which it describes under spring action.

#### The Automobile in Military Service.

Every new invention relating to means of transportation or communication is immediately investigated with respect to its applicability for military purposes, especially in Continental Europe, where immense sums are spent annually for armies, and the most stremuous efforts are made to keep the fighting forces up to the highest pitch of efficiency. The automobile has played a more or less prominent part in the annual manœuvres of the German and French armies for years, and the great services

which motor cars may render in times of war are now so thoroughly recognized in these countries that the respective governments are paying bonuses to the owners of certain classes of motor vehicles which are available for the use of the governments in the event of war. Both countries also take up a periodical census of all motor cars over a certain horse power in the country, which are subject to conscription in the event of war, the same as horses.

In this country the possibility of employing automobiles for military work was recognized probably as early as abroad, for as early as 1896 or 1897 Major Davidson, of the Northwestern Military Academy of Highland Park, Ill., made an attempt to demonstrate its value for dispatch bearing purposes by starting on a three wheeled gasoline car from Chicago to New York. The task, however, was too severe in view of the state of development of the industry, and the absolute failure of that experiment would appear to have had a discouraging effect on the Army authorities. That they became rather dubious of the reliability of the gasoline motor may be inferred from the fact that in 1902 the Army adopted electric ambulances. Steam automobiles were also adopted for various purposes, and, aside from the acquisition of a gasoline motor propelled portable machine shop about five years ago the United States Army authorities do not seem to have introduced any gasoline motor cars.

Of late a number of manufacturers have been endeavoring to demonstrate to the authorities the different kinds of work gasoline vehicles can accomplish in connection with military operations. At the recent manœuvres in Massachusetts a 3 ton truck did very creditable service. In February, 1908, while the roads in the Middle West were first deeply covered with snow and then deep with mud, a touring car made a very successful trip, bearing a dispatch from New York to Fort Scott, Ark., and just recently another car has completed a similar dispatch bearing trip from ocean to ocean. We have, of course, had many other demonstrations of the ability of modern cars to make headway under practically all road and weather conditions and of their entire reliability; but these direct demonstrations of the utility of gasoline vehicles in military work should carry particular weight, and the first time the question of improving the equipment of our Army comes up again the automobile certainly deserves consideration.

#### Improvements in the Fuel System.

Instances of the failure of fuel flow to the carburetor in the case of cars equipped with the gravity feed system, when climbing excessively steep grades with nearly empty tanks, have been by no means uncommon during the present season. In some cases the expedient of turning the car around and backing up the hill has had to be resorted to. In several of the 1010 announcements it is to be noted that the carburetor will be placed lower than formerly, so that the difference in level between it and the tank may be increased and a flow assured under more extreme conditions than formerly.

Quite a large proportion of the cars now built are equipped with an emergency or reserve fuel tank, which, as a rule, is merely a compartment within the main tank, the flow from which is independently controlled. This reserve compartment should be, and usually is, in the extreme upper portion of the main tank, and the gasoline within it is thus under ample head, no matter how low the level in the main tank may be. A full emergency tank usually insures immunity from the above mentioned annoyance of arrested fuel flow on excessive grades, and it is rather remarkable that all cars are not fitted with such tanks. The provision of an emergency tank upon the dashboard or a small tank under the hood, which is automatically kept filled from the main tank, constitutes another solution of the problem. In order to secure full benefit from the ordinary form of emergency tank, its contents must be capable of being turned on conveniently and quickly when conditions arise that cause the supply from the main tank to fail. It should not be necessary to raise the floor boards or to take up the cushions and seat boards in order to manipulate the valves. One well known car is now provided with a small hand wheel conveniently placed upon the side of the body. This handle controls both tanks, and usually indicates the "on" and "off" conditions of both the emergency and the main supplies. In this connection it may be remarked that rather more attention is now being paid than hitherto to making gasoline shut-offs accessible. If the gasoline valve is conveniently located, it is a safeguard in case a car takes fire and is more likely to be shut when the car is left standing, thus reducing the likelihood of theft and the danger from fire should the piping or the carburetor develop leaks.

It is believed that if the elevated emergency fuel compartment, with easy means of turning it on and off, is provided on all cars, there will be little need of resorting to the use of emergency air pumps for creating the necessary head to cause fuel feed in gravity systems, except possibly in the case of very long, low hung runabouts, with their front seats very far toward the

#### More Complete Equipments for 1910.

In previous seasons it has been the common policy for manufacturers of low and medium priced cars to furnish a rather meagre equipment, so as to sell the car at as low a price as possible. In the announcements of 1010 models a great change is observable. Quite a number of manufacturers are furnishing their cars with a very complete equipment, and some of them have even increased the selling price in order

Even though the car is sold at a higher price in order to include a liberal equipment it may still prove a good bargain to the buyer, for the maker usually gives the customer at least part of the very considerable saving which comes from buying equipment in large quantities.

Many people wonder why cars are not more generally listed at two prices, one with and the other without equipment. But as a matter of fact it is of considerable. advantage to a manufacturer to know from his orders as soon as possible just how many of each article of equipment he will require for his season's output. If he can tell this he can buy to much better advantage, and, of course, can furnish the material to the purchaser much cheaper. So, as it is advantageous to both maker and user, we may expect the practice of furnishing a rather liberal equipment to become common.

#### Coming Events.

September 21 to 29-Munsey Reliability Run, Washington, Boston and return.

October 7-Philadelphia (Pa.) Second Annual 200 Mile Stock Chassis Race in Fairmount Park, Quaker City M. C.

October 30-Vanderbilt Cup Race, Long Island Motor Parkway, Long Island, N. Y.

November 6 to 13-National Automobile Show under the auspices of the N. A. A. M. at Atlanta. Ga.

November 9-Atlanta, Ga., Track Races, Atlanta Automobile Association.

November 22-Flag-to-Flag Reliability Run, from

Denver to City of Mexico. 29-30-Philadelphia

Midwinter Endurance Contest, Quaker City M. C. December 31 to January 7-New York City Asnual Show, Grand Central Palace, American Motor Car Manufacturers' Association.

January 8 to 15-New York Annual Show, Medison Square Garden, Association of Licensed Astomobile Manufacturers.

#### Advantage of Offsetting Cylinders.

A paper on "Offsetting Cylinders in Single Acting Engines," read by Prof. T. M. Phetteplace before the American Society of Mechanical Engineers, has brought out a rather interesting written discussion, which is published in the latest issue of the society's Proceedings.

Winslow H. Herschell states that in December, 1907, he had occasion to investigate the question of offsetting cylinders for large sized gas engines, the conditions being somewhat different from those of the automobile engines considered by Professor Phetteplace. Only the variations in maximum and average pressure on the cylinder walls are considered, these being the main questions at issue

For the sake of simplicity the graphical method mentioned in Tolle's Die Regelung der Kraftsmaschinen, page 32, was used. The computations were based on an actual card from a four stroke cycle producer gas engine, and upon the following data:

R. P. M. = N = 225 W/A = 4.18 R = 12 inches = 1 foot L/R = 50.00034 W/A N<sup>2</sup> R = 71.8

This last value, 71.8, happens to be very nearly the average of the two corresponding values, 34.4 and 111.38, given by the author. Computations were also made using speeds of 450 and 1,000, giving inertia constants of 289 and 1,430, respectively, but it soon became evident that there could be no gain from offsetting under these conditions, and the investigation was restricted to the speed of 225.

The author of the paper considered only vertical engines, or horizontal engines where the weight of the reciprocating parts is so small that its direct effect in increasing or decreasing the pressure on the cylinder walls need not be taken into account. In the present case, however, a distinction must be made between vertical and horizontal

engines. For the latter, when the side pressure acts downward, due to gas pressure or inertia forces, the weight of the piston must be added, but when the side pressure acts upward the piston weight is subtracted. It should be noted that for a vertical engine, for a given value of 0.00034 W/AN2R, that is, for a given inertia constant, it would make no difference whether this value were obtained with a large value of W/A and a small value of N, as in the present case, or with a small value of W/A and a large value of N, as in the cases used by the author. But, on the other hand, it would make considerable difference for a horizontal engine where the value of W enters

ertia forces we have line GH for a vertical and line JK for a horizontal engine,

It will be noticed that line JK is not parallel to line GH. The reason for this is that for the line JK we must use the inertia force near the end of the second stroke, which gives a downward pressure on the cylinder walls to be added to the weight of the piston, and this downward pressure is not as large as the upward pressure near the beginning of the second stroke, which was used for the line GH.

In the case of a two stroke cycle engine, where we must use the fourth instead of the second stroke, our maximum inertia force will be near the beginning of the fourth

TABLE I .- OFFSET AND PER CENT REDUCTION IN SIDE PRESSURE.

Curves.	Dominating Factors.	Case,	Offset.	Gain.	
	Gas middle first, inertia beginning 2d.	Vertical late ignition, 2-4 cycle.	37.0	41.5	
	Gas middle first, gas beginning 1st.	Vertical early ignition, 2-4 cycle.	28.7	31.6	
DE and JK	Gas middle first, inertia end 2d.	Horizontal late ignition, 4 cycle.	37.7	34-7	
DE and QR	Gas middle first, inertia beginning 4th.	Horizontal late ignition, 2 cycle.	61.3	54-3	
DE and JK	Gas middle first, inertia end 2d.	Horizontal early ignition, 4 cycle,		34-7	
DE and NP	Gas middle first, gas beginning 1st.	Horizontal early ignition, a cycle.	40,6	37.2	

into the computation apart from the inertia constant.

By using the same indicator card as for the four stroke cycle computations, and disregarding the second and third strokes, the approximate side pressures for a two stroke cycle engine were obtained.

Fig. 1 shows the variation in the maximum pressure of the cylinder walls, or side pressure, due to variations in offset. The ordinates above the base line ST are proportional to the side pressures. The line A B shows the maximum side pressure for a vertical engine at about the middle of the first stroke. As the offset increased the angle of the connecting rod for this middle position decreases, while the angle at the end of the stroke increases, so that for large offsets the maximum side pressure is found at the end of the stroke, with values as shown by line BC. Similarly, for a horizontal engine we get the lines DE and EF. For the maximum side pressure due to instroke acting upward, so that the weight of the piston must be subtracted, giving line Q R.

If we imagine a somewhat earlier ignition than that shown in Fig. 2 of the paper, the maximum side pressure at or near the beginning of the first stroke will be increased. Whether for this reason or not it was found that with large offsets the maximum side pressure of the first stroke was at the beginning of the stroke, acting upward, with values as shown by line L M for a vertical, and line N P for a horizontal engine.

Table I gives the offset and the per cent. reduction in side pressure in each case.

The author of the paper found the most favorable offset to be 50 per cent. of the crank length for slow speed, and about 20 per cent. for high speed. These values may be compared with the first line of Table 1; for the case of a vertical engine with late ignition, the offset is 37.0 per cent., which is nearly the average of 20 per cent. and 50

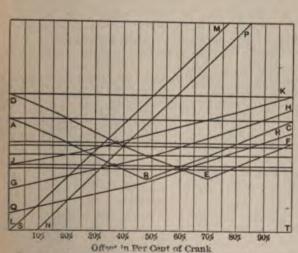


Fig. 1.—Diagram Showing Variation in Maximum Pressure on Cylinder Walls Due to Offsetting Cylinder.

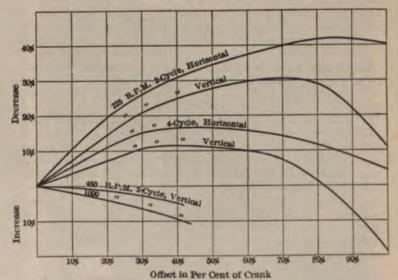


Fig. 2.—Diagram Showing Change in Average Pressure on Cylinder Walls Due to Offsetting Cylinder.

per cent., as might have been expected from the inertia constants.

Fig. 2 shows the decrease or increase in average side pressure or total loss of work from side pressure in per cent. of lost work with zero offset. While the use of a different indicator card with a later ignition might have made some difference, it obviously could not have changed the result so materially as in the case of maximum side pressure.

The curves marked 450 and 1,000 r. p. m. show the results of the few computations concerning these speeds not considered in Fig. 1.

Both Table 1 and Fig. 2 appear to indicate that more could be gained from off-setting with a two cycle than with a four cycle engine. But at present it is difficult to make general statements about this type of engine, and whether or not this advantage will be attained will depend upon the inertia constant and indicator card shown by these engines.

#### PRINCIPAL CONCLUSIONS.

- a. An offset cylinder may be employed with least benefit on a high speed, four stroke cycle vertical engine.
- b. It may be employed with most benefit on a slow speed, two stroke cycle horizontal engine.
- c. The maximu advantageous offset is limited by the side pressure near the beginning of the first stroke.

## Cornell University to Make Road Tests.

The engineering department of Cornell University, Ithaca, N. Y., has arranged with the United States Office of Public Roads to conduct a series of comparative tests of road building materials. A road consisting of a number of different materials will be built, the road to be utilized for this purpose being a continuation of the State road at East Ithaca, N. Y. It will be constructed in sections of brick, concrete and bituminous macadam of different kinds. Nearly a dozen manufacturers of bituminous macadam have decided to co-operate with the university authorities.

## Cleveland Auto School Changes Hands.

The automobile school formerly conducted by the Central Y. M. C. A. at 2160 East Ninth street, Cleveland, Ohio, has been purchased by C. H. Pratt and W. B. Pettibone, former principal and instructor of the school, and M. N. Fowler, former educational director of the Central Y. M. C. A. The school opened September 27 with both day and night classes. The evening class meets two evenings each week, and completes the course in three and a half months. The day class meets every day and completes the course in four weeks. The course consists of fourteen explanatory lectures, shop practice and twelve driving lessons. New day classes are opened each month, and evening classes every two months.

#### Motor Fire Appliances in Glasgow.

It is nearly four years since the corporation of Glasgow introduced motor power into the service of its fire department, and the results have been so satisfactory from every point of view that it is the intention to gradually substitute motor fire vehicles for steam fire engines, so that ultimately horse and steam power will be entirely dispensed with.

Detailed specifications for a gasoline driven motor fire brigade tender, covering the following accessories and appliances, have been transmitted by Consul McCune, and are on file in the Bureau of Manufactures, Washington, D. C., and cover engine, carburetor, ignition, cooling, gasoline tank, lubrication, clutch, gear box, wheels, back and front axles, steering, frame, wheel base and wheel track, springs, brakes, body, outfit and fire escape; also for chemical engine, its composition and weight.

There are in the central district of the city fire department three gasoline engines, which have each four cylinders and are capable of developing 50 to 55 horse power. Equipped with 12 feet of canvas hose, 25 feet of suction hose and other necessary gear, and manned by ten men, they easily maintain a speed of 30 miles an hour. They are provided with duplicate systems of ignition, one by high tension magneto and the other by accumulators and trembler coil. The pumps are geared to the gasoline motors by means of shafts runnig down the centres of the vehicles, having spur wheels engaging with steel pinions on the first motion shafts of the gear boxes. These pinions can be thrown in and out of gear by hand levers operated from the sides of the machines, enabling the pumps to be instantly put to work on arrival at a fire.

The change speed gears have three speeds forward and one reverse. The wheels of the machine are interchangeable. The weight, manned and fully equipped, is 4 tons 8½ cwt.; length, 14 feet over all; wheel base, 9 feet 8 inches; track, 5 feet 6 inches.

When stationary, and pumps working, cooling is maintained by supply from the delivery to the cooling tank, the water being allowed to flow away through the overflow-pipe. These pumps are of the turbine type.

FIRST AID MOTOR AND MOTOR FIRE ESCAPE.

The department has also in use a motor first aid machine to carry an officer and twelve men, with 650 yards of 2½ inch canvas hose, 18 feet of scaling ladder, in two lengths, ambulance box on rear footboard, and all necessary tools and gear. It is a four cylinder, 24 horse power machine, and weighs when fully equipped and manned about 3 tons. It has four speeds forward —7, 11, 16 and 22 miles an hour—and one reverse.

At present the department has but one motor fire escape, which carries an extension ladder of 85 feet on a turntable. When traveling the machine is 26 feet long, 10 feet high, weighs 6!2 tons, and is driven by a four cylinder, 30 to 40 horse power gaso-

line motor, with battery and magneto ignition. The gasoline motor drives a dynamo or generator, which transmits the current, through flexible cables, to two electric motors, hung on the front axle and geared up to the front wheels, which have solid rubber tires. There are five speeds forward, up to 20 miles an hour.

The control of power and brakes is by one hand lever, situated below steering wheel. The machine is easy to drive and steer, and, owing to the extremely quick action of the electric brakes, can be safely handled in heavy traffic. The ladder, when raised from its horizontal position on the carriage to the angle at which it is desired to work, is extended by means of a small engine, bolted to the side of the main ladder. and driven by carbonic acid gas, the gas being contained in four cylinders fastened on the turntable. Enough gas is contained in the cylinders to extend the ladder a number of times without refilling. Automatic safety catches are fitted to the sliding ladders for security in raising or lowering. An oil brake is fitted to the foot of the ladder to allow of ladders being lowered without using winch handles. All the bearings throughout are anti-friction, ball or roller, and the releasing gear, to unlock ladder by same action, takes weight of whole machine off back springs, thereby preventing any chance of the ladder, when in action, sagging to either side. The machine has a 12 foot 4 inch wheel base, and a 6 foot track, and its stability is such that, while self supporting, four men can safely manipulate two lines of hose from any desired position on the ladder.

#### British Motor Spirit Imports.

Consul J. N. McCunn, of Glasgow, makes the following report on the increase in the consumption of motor spirit in Great Britain:

"Official statistics show that during the past few years the sale of motor spirit has developed enormously in this country, and that expansion of the business continues. Over 32,000,000 gallons were imported in the six months ending with June, 1909. 12,000,000 gallons more than in the corresponding six month of 1908, and upward of 17,000,000 gallons more than in the same period of 1907.

"Fully 50 per cent, of the total supply of gasoline imported into the United Kingdom is received from the Dutch Indies. The United States is a good second in furnishing the supplies, having new producing fields of high grade oil. During the first six months of 1909 the United Kingdom thus secured about 10,000,000 gallons of American motor spirit, fully 8,000,000 more than in the corresponding six months of the previous year. Russia is pushing its motor spirit export trade with great energy and heavy shipments from the Grozny field are now reaching the British market. . The new oil producing countries exporting to Great Britain are Roumania and Mexico.

# NEW VEHICLES AND PARTS ➤ ➤



#### The Haynes Model 19.

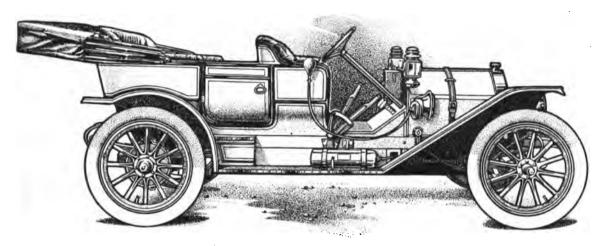
In addition to the large car which they have been manufacturing for the last several years, the Haynes Automobile Company, of Kokomo, Ind., are bringing out for 1910 a five passenger "30," which they are making a leader. Since the former car is too well known to require descrip-

warm water discharged from the top over the combustion chamber. These water jackets are designed so that the greatest amount of water is at the top of the cylinder, where the temperature is the highest. A large opening over the water jackets provides for the removal of core sand, and also provides for the easy inspection of the cylinder casting at any time. A large brass plate covers the cylinder head, and forms an outlet through which the heated water passes to the radiator.

The compression in the cylinders is 65 pounds. The inlet valves and carburetor

and also a dental clutch between the pump and magneto, which latter is situated at the rear of the pump. This arrangement of joints allows for the removal of either pump or magneto without disturbing the other.

The valves are 2½ inches in diameter, have a thirteen-thirty-second inch lift, and are interchangeable. They have three-eighth inch diameter stems. The valves are mechanically operated by two cam shafts, one on either side, and are actuated by cams and roller lifters. The valve lifters are drilled and tapped in the top, and an



THE NEW HAYNES LIGHT CAR MODEL 19.

tion, the smaller car will only be dealt with in this article.

The cylinders are of gray iron, cast in pairs, with offset intake and exhaust valves on opposite sides, the motor being of the well known T type. The cylinders are bored, reamed and ground to size. The cylinder dimensions are 4½ inch bore by 5 inch stroke. The water jackets are spacious, and the cool water is taken in on the exhaust side of the motor, and the

are located on the right side of the motor, the carburetor (a Stromberg) being located midway between the cylinders in such a position as to afford convenient adjustment. The exhaust valves are located on the left side, and directly beneath the exhaust manifold are located the water circulating pump and the magneto, both of which are driven by the same shaft and gear. There is, however, a joint in the shaft between the pump and driving gear.

adjusting screw is inserted, with a lock nut, which allows for close and accurate adjustment of the valves at all times. The valve lifters work in cast iron guides, and are hardened and ground, as are the valve stems. The valve seats are also ground. Nickel steel valve heads are used, which are electrically welded to the stems. The valve springs are held in place with a key and cup, the cup being counter bored to receive the spring and hold it in position.





HAYNES MOTOR, INTAKE AND EXHAUST SIDES.

The pistons are long, and are turned and ground to the proper diameter. Each piston has three compression rings and a snap ring to hold the piston pin in place. These rings, which are not eccentric, are ground on three sides, and have a 45 degree joint.

The piston pin is made hollow, to aid in oiling the bearing; it is of 3½ per cent. nickel steel, one inch in diameter, and held in place, as before stated, by a snap ring around the outside of the piston.

The cam shaft shows careful thought as

The crank case is cast of aluminum alloy, in two pieces. The top portion contains a compartment or housing for all gears. These gears run in an oil bath, and are thus protected from wear and are quiet in operation. The lower half contains the oil reservoir, and is entirely independent of the crank shaft bearings. This lower half has a well the full length of it, into which the surplus oil from the splash pans runs, and from where it is pumped by a small gear pump back to the bearings. A constant level of oil is maintained in the

ened by one edge being turned at right angles to the blade, this stiffening rib being one-quarter inch high. The fan runs at two and one-half times the engine speed.

The water pump is a gear pump, with a good sized sediment chamber below it, in which is inserted a wire gauze cone. This cone strainer prevents any foreign substance, such as solder, getting into the pump gears and causing damage. The pump shaft is supported on both sides of the pump gears by liberal bearings. On the outer ends of these bearings are stuffing boxes, which are easily accessible for repacking. These bearings hold the pump shaft in perfect alignment, and the stuffing boxes take care of any possible leakage.

A cellular radiator is used, and the whole system holds 5 gallons of water. A breather pipe is located on the right hand forward crank case arm to relieve the crank case compression, and is so situated as to entirely avoid any splash of oil through it onto the motor or hood. A Splitdorf low tension magneto is used, with a non-vibrating coil, which is located on the dashboard. A single glass sight feed is also located on the dash for the oiling system.

The clutch is the well known Haynes contracting band type, 14 inches in diameter and 2 inches wide, with steel working against bronze. It can be adjusted very quickly. The clutch is now piloted on the end of the crank shaft, which keeps it perfectly central and insuring smooth, uniform engagement.

A sliding gear selective type transmission is used, with Timken bearings throughout. Liberal gear surfaces are used, but the whole gear is very compact and is located underneath the footboard, where it is easy to get at. All gears in the transmission are of nickel steel, harveyized, and run in oil, the gear casing being oil tight. A propeller shaft, with double universal joints, transmits the power to the rear axle. The yokes of the universal joints are slotted, hardened and ground. In these slots



DRIVE SHAFT.

to bearing size and location. Each shaft is one inch in diameter, and has four bearings. The front bearing in the outer gear casing is 1¼ inches long; the next bearing, inside the cam shaft gear, is 2 17-32 inches long; the centre bearing is 6 inches long, and the rear bearing 2½ inches long. The long bearing in the centre tends to prevent the shaft from springing away under the pressure on the cams when in operation. The cam shaft is made of 0.40 per cent. carbon steel, hardened and ground. The cams are of nickel steel, heat treated and pinned to the shaft with hardened nickel steel pins.

The connecting rods are drop forged and to inches long. The top or piston pin end is split and provided with a screw and lock nut for tightening the piston pin bushing. This bushing is made of phosphor bronze, and is 2¼ inches long. The lower end of the connecting rod has a marine type bearing into which are fitted nickel babbitt bushings, with provision for adjustment. The lower bearings are 2 inches long and 1¾ inches in diameter. All the bearings on the crank shaft are of nickel babbitt.

The crank shaft is drop forged, with all bearings 134 inches in diameter, and has a combined bearing length of 133% inches. It has four bearings, the rear bearing, next to the clutch, being 434 inches long, the centre bearing 31/2 inches, the next bearing 334 inches, and the front bearing in the outer gear casing 13% inches long. At the extreme end of each of the end bearings on the crank shaft is turned a small cone shaped flange, which prevents the oil from working out of the end of the bearing onto the motor and parts. The oil flung off by the flange is caught in a small reservoir and returned to the crank case. The flange to which the flywheel is bolted and keyed is forged integrally with the crank shaft.

Great care is used to obtain perfectly balanced reciprocating parts. The connecting rods and pistons are finished to uniform weights and carefully balanced. A cast iron flywheel, 18 inches in diameter 1 weighing 82 pounds, is used.

connecting rod splash pans. The oil pump is placed at the rear of the motor on the right hand side, and operated from the inlet cam shaft. The oil pump drive shaft is so arranged that a timer can be attached if so desired.

The inlet manifold is T shaped, having but two outlets, with the inlet from the carburetor midway between the outlets. Each pair of cylinders has an inlet chamber common to both cylinders in the pair. The exhaust is arranged in a similar manner, the exhaust manifold being slightly tapering and connecting through a long pipe to the Kingston muffler, located at the rear end of the chassis.

The cam shaft gears are of open hearth steel, cut with helical teeth, and mesh with the steel pinion on the crank shaft. The water pump and magneto driving gear are driven from the exhaust cam shaft gear. Each of these several gears has a bearing on both sides, which prevents any springing away under load.

The fan is located on the top of the gear compartment, and provision is made for adjusting the belt. The fan has a ball bearing hub, and the blades are strength-



CLUTCH BAND AND GEAR BOX.

hardened and ground trunnions which in turn work on hardened and d pins. The rear joint is flanged, and lange bolts to a corresponding flange e bevel pinion shaft. This arrangepermits of removal of the rear axle ut taking down the universal joints. rear axle is of the full floating type, a pressed steel differential housing. a bevel gear and pinion drive, with er gear differential. Large Timken bearings are used on both sides of fferential case, which, of course, take e end thrust. Two Timken bearings ed on the driving pinion, and take up nd thrust on it.

rear axle drive shafts are of nickel squared at the ends. The inner ends o the differential gears, while to the ends the wheel hub flange is shrunk. seems to be a departure from the ordiaccepted method, as the flange is ted to the wheel by the hub bolts. method reduces the wearing surfaces ninium. The torque rod is of pressed

inches narrower in front, to increase the turning range.

Semi-elliptic springs, 39 inches long, 2 inches wide, with six leaves, are used in front, and three-quarter scroll elliptic, 41½ inches long, 2 inches wide and with six leaves, are used at the rear.

The speed control and brake levers are short, and are located at the correct angle to give comfort in manipulation. These levers are drop forged. The speed lever works in an H slot, the emergency brake lever on a ratchet quadrant.

The brakes are internal expanding and external contracting, the internal brake being the emergency or hand brake, and the external the service or foot brake. Both are provided with equalizers, and neither brake is connected with the clutch in any way.

A copper gasoline tank holding 18 gallons is located under the front seat. The front fenders are long and rakish, giving the car a good appearance, while both fenders are designed to protect the occupants of the car from mud and splash. The hood is



REAR AXLE.

of channel section, and is supported at

wheels are 34x4 inch, with twelve s and Marsh standard quick detachans for all four wheels. Brake drums hes in diameter and of 21/4 inch face tached to the rear wheels. The front is a one piece drop forging of 21/2 It is set at 15 tons. The pads are forged integral. The wheel es are It inches in diamter, and fittih Timken bearings. The steering of good length and insures comfort ving. All steering connections are of Il and socket type, and a 17 inch steerheel, with metal spider, is used. The ig wheel turns independently of the I levers, which latter move over a quadrant on top of the wheel. The ig gear is of the worm and gear type, orm gear being a complete wheel. By g the steering wheel through five comrotations with the steering levers disted an entirely new wearing surface

frame is of pressed nickel steel of el section. It is dropped 2 inches in of the rear axle, lowering the centre wity, making the car easier to handle asier riding. The frame is made 4 271/2 inches long and 21 inches high, and is of oval design. Plenty of room is left between the front seat and the dash, while pedals of different length can be had to accommodate either a short or a tall person. The steering column is set at a comfortable angle for driving, being neither too far away nor too close. The distance between the front seat and the dash is 25 inches; the depth of the front seat, 10 inches; the distance from the back of the front seat to the front of the rear seat, 25 inches; the depth of the rear seat, 19 inches; the width of the rear seat, 50 inches; the height of the rear seat, 141/2 inches; the extreme length, 153 inches.

The body is low and well proportioned. Steps over the brake levers into the tonneau facilitate ingress and egress. The color of the cars is either blue or green. The equipment includes five lamps, viz., two large gas lamps, two square side oil lamps and one round oil tail lamp; also a Prest-O-Lite tank, Diamond tires, a brass tube folding front and a top. Deliveries of these cars will begin October 1.

A new car called the Paige has appeared on the streets of Detroit. It has a three cylinder, two cycle engine.

#### The Regal "Thirty" for 1910.

The 1910 model of the Regal 30 is a continuation of the 1909, except for some minor changes not affecting the principles of construction, but adding to the convenience of the user or improving the operation of the car.

The motor is still a 4x4, with all valves on one side. A leather faced cone clutch, enclosed, grease tight universal joints, and a three speed selective transmission located on the rear axle are other features that are retained. The wheel base has been lengthened 2 inches, making it 107 inches. The body has been made a little roomier and the lines thereof have been improved, and this, together with the curved dash and new fenders, gives the car a somewhat different and improved appearance.

The engine has been refined in several particulars. The pistons now are fitted with three rings above the piston pin and one below, thus giving additional insurance against compression leakage and preventing an excess of oil from getting past the piston if at any time too much of the lubricant should be poured into the case by a careless user. A pressed metal float has been provided in the lower case which indicates the height of the oil by means of a stem which extends from the float up through a glass tube located on the upper crank case. As this tube is air tight and the oil never gets into it, it is always clean and the stem is easily seen. Any sight tube that contains oil will very soon become dirty and make it almost impossible to determine the level.

The fan has been removed from the radiator and is now placed on an adjustable bracket attached to the cylinders and braced by the lower crank case. This fan, equipped with ball bearings, is driven with a V belt and needs oiling only once or twice a season.

A gear pump is provided, as formerly, except that the housing of the pump is made in one solid piece, thus saving about onehalf the weight and doing away with the possibilities of a leak at the union of the two castings.

A long cylindrical strainer is provided at the intake, and the oil is discharged through a steel tube onto the main bearings. An overflow returns the oil to the reservoir, which holds about 1½ gallons.

A breather pipe about twice the capacity of the old one has been provided, which not only effectively relieves any crank case pressure but also provides a very easy means of filling the oil tank. A baffle is provided in this breather pipe which effectively prevents oil from being thrown out.

If a cam shaft has but a very slight end play in its bushing it will cause a knock, which is sometimes very hard to locate. To guard against this trouble the rear end bushing is threaded so that it may be moved backward or forward to adjust it endwise accurately, slots being cut in the bushing to hold it from turning by means of a



THE REGAL "THIRTY" 1910 MODEL

dowel pin while it is being moved endwise.

The Regal has a thermo-siphon cooling system which is said to have proven so successful that not a single complaint has been received on the whole year's output. The accompanying cut shows the principle of its action, and while it is very similar to the ordinary arrangement, it has some points which make it more efficient.

If the pipe extends from the engine to the top tank of the radiator a slight lowering in the water level will leave an open spot in the system so that the water will not circulate, except in spurts when enough steam has been generated to push the water over the intervening space. To overcome this difficulty the pipes have been lowered so that they rise on a silghtly inclined line, which permits the water level dropping to a much greater extent before the circuit is broken. Now, should this central tank extend entirely through the radiator there would be a hot stream of water tending to rise, which upon cooling would tend to drop through the same tube, so there would be two forces in opposite directions. In the Regal system, however, the tank extends only half way through the radiator, so that the hot water rises at the rear, becomes cooled, and descends through the front of the radiator, so that there is an uninterrupted flow. To further facilitate the circulation a 2 inch pipe is used at the bottom and two 13/2 inch pipes are used at the top, which, together with the free passage through the water jackets, allow an uninterrupted flow, which is necessary in a successful thermo-siphon system.

The leather faced cone clutch has proven entirely satisfactory, so that no changes have been made. This applies also to the universal joint in the ball end of the propeller tube.

The transmission, located on the rear axle, has been improved by the use throughout of high duty nickel steel Hyatt bearings. All these bearings are encased in solid, hardened and ground bushings, and run upon the hardened and ground ends of the shaft itself.

The shafts and gears are all of nickel steel, the gears being cut with teeth especially constructed for strength at their base. The diameter of the rear axle tubes has been increased from 2 to 2½ inches, to make a more rigid construction, and to further improve this member the axle shafts are now made of nickel steel.

The most frequent cause of noisy gears in the rear axle is the lack of adjustment for the driving pinion and bevel gear, which is attached to the differential. On many cars there is no adjustment in either case, but this construction is fitted with an adjusting collar which will move the small bevel pinion back and forth, while two other adjusting collars are found in the rear axle which will move the large bevel gear in either direction, so that it is possible to accurately adjust these gears for noiseless operation.

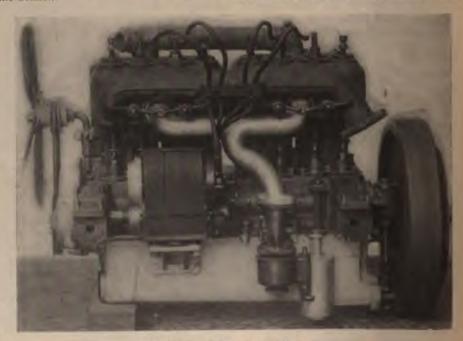
The lines of the body have been improved by slanting the seat backs slightly more toward the rear, making one straight line along the arms of the seats and the top of the door, and by making the door plain without a break at the middle. The seats and the doors are made of sheet metal, while the material of the under body is wood, as heretofore. More clearance has been provided between the wheel and the fenders, and the dash has been curved at the top to follow more closely the top of the bonnet.

Cadillac 1910 Model.

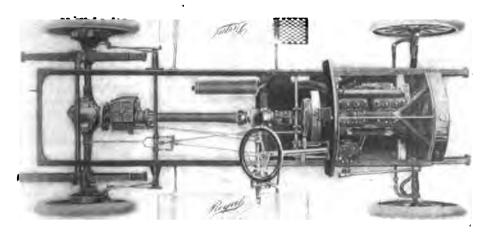
During the coming season the Cadillac Motor Car Company will again devote themselves to the production of a four cylinder, 30 horse power model. The new "Thirty" will be very similar to this season's car. Indeed the mechanical details are almost identical, and readers who desire a more complete description of these than is here given are referred to the description of the 1909 car, which appeared on page 932 of Vol. 22.

The new car is slightly larger than its predecessor. This increase in size is most apparent in the motor, which has been enlarged enough to make the car more powerful in proportion to the car weight than the former model. Its bore has been increased from 4 to 4¼ inches, but the stroke remains 4½ inches. While the A. L. A. M. rating is slightly under 30 horse power, the motor is said to develop 33 horse power on continuous dynamometer test.

The cylinders are cast separately, with the typical Cadillac copper water jackets and attached heads. Valves are all on one side. The crank shaft has five plain bearings. Lubrication is by splash, with oil level maintained by a mechanical oiler which circulates the oil through a sight feed on the dash. Cooling is by water circulated by a gear driven gear pump. The fan is mounted on two point ball bearings, and is driven by a V belt. In this season's car a magneto is supplied as part of the regular equipment. The Webster magneto is fitted, a new type which we expect to describe in a short time. It works on the low tension system, has a vertical shaft, and the motor may be started from the seat with this system as well as with the battery system. The battery system is the "Delco," which comprises a four unit coil attached to the motor, and a special switch on the dash. The battery consists of dry cells, carried in a metallic case under the front seat. When



REGAL THIRTY HORSE POWER MOTOR.



PLAN VIEW OF REGAL CHASSIS.

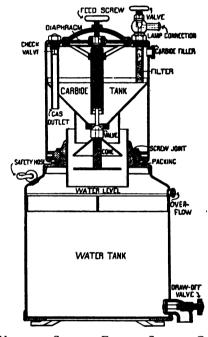
the dry cells are being used the ignition is by single spark, so the cells last for a long

The clutch is a leather faced cone with the male member cut in several places to give easy engagement. The change gear is a sliding selective, giving three forward speeds and a reverse. The drive to the rear axle is by a housed shaft, with enclosed globe joint to the frame, and single universal joint within the globe. Lubricant is supplied from under the seat, through a tubular connection. The rear axle and driving shafts are mounted on balls at their inner ends and on Hyatt rollers at the wheels. The axle housing is made from pressed steel. The front axle is an Eliott type forging of I section, whereas last season a tubular axle was used. The wheels run on two point bearings, and the pivots are provided with hall thrusts

As in the 1909 car, semi-elliptic springs are used in front and three-quarter elliptics in the rear. The dimensions are: Front, 36x2 inches; rear side springs, 42x2; cross spring, 38x2 inches. The side members of the frame are bent upward above the rear axle to give the proper clearance and bring the centre of gravity low. The height of the car is thus about the same as in this season's model, in spite of the larger wheels. At the rear the frame is 33 inches wide, but at the front it is narrowed to 30 inches. The steering gear is of the worm and sector type, with the case for the gear set placed rather higher than usual, so that the levers at the lower ends of the central control shafts are conveniently located for connecting to the timer and the throttle. The steering wheel is 17 inches in diameter. Both sets of brakes are on the rear wheels, the external brakes are operated by a pedal and the internal by a hand lever. Gear shifting is controlled by a hand lever working in an H slot.

The tire sizes have been increased from 32x31/2 inches to 34x4 inches. Quick detachable rims are provided. The hub flanges and spokes have been made heavier to correspond with the increased diameter. The wheel base has been lengthened to 110 inches, as compared with 106 inches on the previous model. This increase has permitted the use of a more roomy body. The tonneau seat is wider and there is more foot room. The tread is 56 inches.

The 1910 car is sold at \$1,600 instead of at \$1,400, on account of its more expensive



VERTICAL SECTION ELLIOTT STORAGE GEN-ERATOR.

cessories being included in the price of the

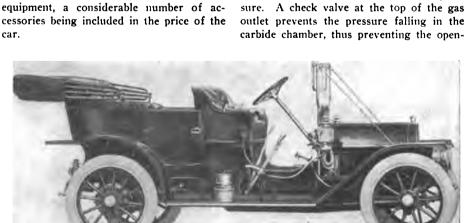
#### The Elliott Storage Generator.

This generator, manufactured by the Eco Manufacturing Company, of 53 State street, Boston, is of the carbide feed type, a principle which has not hitherto been applied to acetylene generators for automobiles. The gas is generated under a pressure of about 4 pounds, and as there is considerable storage space, gas may be available at all times, thus giving many of the advantages both of the ordinary generator and gas tank. In size this generator is only slightly larger than the ordinary type more frequently met with.

As can be seen from the section, the device is remarkably simple. The carbide chamber is above the water reservoir and is closed at the bottom by a conical valve which in operation is held open by a spring against the action of the gas pressure on a diaphragm. When the pressure rises above a certain predetermined point (about 4 pounds) the pressure of the gas on the diaphragm raises the valve to its seat, thus cutting off the feed of carbide. When the pressure falls the spring acts to open the valve against the pressure of the gas. The fluctuation is very slight, being only about 2 ounces.

The construction is such as to insure good, cool, dry gas being fed to the burners, the gas after generation being cooled by its passage through the water. It then passes through an outlet tube from the top of the water tank to the top of the carbide tank. It must then pass downward through the carbide to the bottom of the filter tube, from where it passes through the valve to the lamps. It will be readily seen that any moisture which may have passed over with the gas will be absorbed by this body of carbide.

There are quite a number of interesting features on this generator. One is the safety valve. This consists simply of a T on the top of the water tank. The ends of the T are closed by a short piece of rubber tubing bent round and embracing both ends. In case of the pressure rising to an abnormal degree the tubing will be burst, thus forming an exit for the reserve pressure. A check valve at the top of the gas outlet prevents the pressure falling in the



THE CADILLAC "THIRTY."



THE DEMOT.

ing of the feed valve, and also giving an opportunity for the replacement of the rubber safety tube, the burners in the meantime being supplied by the gas stored in the carbide chamber.

The water reservoir is emptied of the slacked carbide through the draw off cock. With this so situated as to drain directly on the ground, it can readily be seen that this can be easily and quickly cleaned out with a hose when the carbide chamber is removed.

#### The Demot Car.

The recently organized Demot Car Company, of Detroit, have announced the specifications of their little runabout, which are briefly as follows:

The car is strictly a two passenger machine, light and handy, designed so it can be well made and still sell at a low price. The cost of up-keep should also be quite small. Power is supplied by an opposed motor set crosswise in front. It has a 31/2 inch bore and 3 inch stroke, and is water cooled, using a vertical tube radiator and thermo-siphon circulation, without fan. Ignition is by magneto and dry cells. Lubricant is supplied by crank case pressure, and also by splash. This engine design is the result of a long series of tests. A large speed range is claimed to be obtained with automatic inlet valves. The inlet pipe is water jacketed. The motor is set in an aluminum casting, which also carries the change gear, and serves both to line up the power plant and to protect it from dirt.

The change gear is of the planetary type, giving two speeds and a reverse. The control is selective, by a single hand lever. Connection to the bevel rear axle is made through a propeller shaft with two universal joints. No torsion member is provided, the torque being taken by the semi-elliptic rear springs, according to the plan first adopted by the Hotchkiss Company. Ball bearings are used on the shaft for the driving pinion. Plain die cast bushings are used on the differential end of the axle shafts. Hyatt roller bearings are used at the wheels. The axle is, of course, of the fixed hub type. The front axle is a square section forging, which is claimed to be more practical than an I section for a car of this size. The front wheels are ball bearing. All four springs are of the semi-elliptic type. The frame is of pressed steel, and is straight. The wheels are 30 inches in diameter, fitted with 3 inch tires. The wheel base is 80 inches, and the tread is standard. Steering is by an irreversible gear. Pedal operated expanding brakes act on the rear hub drums. The weight is given as 800 pounds. Two side and a tail oil lamp, a dragon horn, tire repair and tool kits comprise the equipment.

#### The Great Western "Thirty."

The Great Western Automobile Company, of Peru, Ind., have just completed the first car of a new model, to be known as their "Thirty," of which a photograph is shown herewith. The cylinders have a bore of 41/4 inches and the piston stroke is 5 inches. The car has a gasoline tank of 20 gallons capacity. Ignition is by high tension magneto. The motor is lubricated by a gear driven mechanical oil pump integral with it. The cooling water is circulated by means of a gear driven centrifugal pump. The radiator action is enhanced by a ball bearing, readily removable fan. The clutch is of the conical type and is lined with a composition that is claimed to insure smooth engagement. A three forward speed and reverse, selective type of change gear is employed. The drive to the rear axle is by an enclosed shaft with a single universal joint. The rear axle is of the semi-floating type, while the front axle is an I section drop forging, forged in one piece with integral spring seats. The car has a pressed steel frame, narrowed in front to permit of turning in a short radius, and dropped in the rear to insure a low centre of gravity. The frame is carried by 48 inch semi-elliptic front springs and 52 inch three-quarter elliptic scroll springs. It has a wheel base of 112 inches and is made with either a 56 inch or a 60 inch tread. The wheels are 34 inches in diameter and fitted with 31/4 inch tires on detachable rims. The car is fitted with two separate pairs of brakes, of the internal expanding and the external contracting types, respectively, both acting on pressed steel drums secured to the rear wheels. The photograph herewith shows the car equipped with a four passenger short coupled body, but the standard body is a five passenger tonneau with divided front seats. The standard color is coach blue with cream running gear. Spark and throttle levers are mounted on top of the steering wheel, and the engine may also be controlled by means of a foot accelerator. A very complete equipment is furnished with the car.

#### The Bridgeford Bevel Gear Turning Lathe.

The accompanying photo illustrates the latest product of the Bridgeford Machine Tool Works, Rochester, N. Y., a lathe for turning bevel gears. This machine has been designed especially for turning simultaneously the face, front and back angles of bevel pinions and gears up to 18 inches diameter, although the first operation, consisting of boring and facing the back, may also be handled advantageously.

The frame, oil pan and reservoir are in one piece. The head stock is of simi-



GREAT WESTERN "THIRTY."

lar design to those used on the company's heavy duty geared head engine lathes. The drive is through a constant speed pulley, 15 inches in diameter, for a 6 inch belt, running at 440 revolutions per minute, and there are twelve spindle speeds, ranging from 5.8 to 214 revolutions per minute. This gives sufficient pulling power to enable three cutting tools to be used up to the limit. All gears within the head are steel and run in oil, and the bearings are self oiling.

The carriage has a travel of 13 inches and is provided with two cross slides carrying angle turning rests, the right hand one having a turret tool holder. The carriage, cross slides and angle rests have power feed and automatic stops, and hand wheels are arranged as shown, within easy reach of the operator for operating the angle rests.

The feed box gives ten ratios of feed ranging from .005 inch to .190 inch per revolution of spindle. The gears are steel and run in oil.

For the first operation the blank is chucked in a universal chuck, bored with a tool in the left hand rest, while the facing is done by tools held in the turret of the right hand rest.

For the second operation the blank is either chucked on a special hub or an arbor in the taper spindle hole, having a split bushing, the left hand turning rest carrying a roughing and a finishing tool for the face angle and the turret of the right hand rest a set of roughing and finishing tools for the front and back angles.

Two of these machines are already in operation in the plant of a well known gear manufacturer, and are said to have shown a great saving in time over engine lathe and turret lathe methods, as well as producing much more accurate work than can be done with forming tools. The total weight of the machine is 7,300 pounds net.

#### The Ronson Wrench.

Cryder & Co., Park avenue and Sixtythird street, New York city, have placed on the market a combination wrench under the above name. It comprises nine distinct wrenches, ranging in size from 18 to 16 inch. The over-all length is 6 inches. and the weight of the tool is only 8 ounces. Each of the four members shown in the illustration is said to be made of flawless plate steel, heat treated. The centre bolt and wing nut are drop forged, and when one of the ends is pulled out for use the rest form a handle which gives a great leverage. The wing nut bolt has a squared shank, making it impossible for the members to turn. The wrench is finished in nickel. The thinness of the members is an advantage in itself, as the wrench can

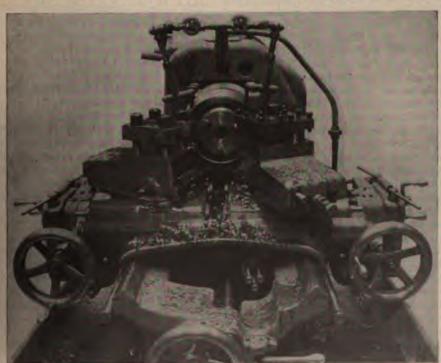


THE RONSON WRENCH.

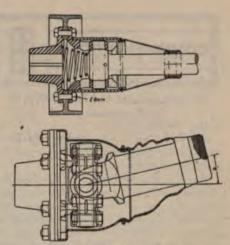
be used in places where no other wrench could be applied. This thinness, of course, requires material of great tensile strength. It is stated that the tool can easily be carried in the pocket without inconvenience.

#### Hartford Universal Joints.

The Hartford Auto Parts Company, of Hartford, Conn., are manufacturing universal joints of two different types in many different sizes and combinations. The first of the two types may be designated as the



BRIDGEFORD BEVEL GEAR LATHE.



HARTFORD UNIVERSAL JOINTS.

split ring type. In this the shafts to be joined are provided at their ends with forks with radially extending bearing pins, which have bearings in a split ring, the two halves of the ring being held together by bolts. The other type is that in which one of the shafts is provided at its end with radially extending bearing pins which have a bearing in sliding blocks adapted to slide in slots in a hollow, hub-shaped extension of the other shaft. The company makes universal joints in various sizes suitable for transmitting 20 to 60 horse power. All of the joints are thoroughly enclosed, and may be packed with grease. The type of joint comprising a sliding block is provided with a coiled spring at the end of the propeller shaft so as to take up all slack and prevent rattling. Some of the joints are assembled together with a brake drum and are designed for being secured to the rear end of the transmission shaft. Complete rear drives are furnished, comprising two universal points and a connecting propeller shaft of any desired length. A feature of these drives is that the shafts are made in one with one member of each universal joint, thus saving the extra weight of the hubs that would be required if the universal joint members were keyed to the shaft. Double universal joints with short length shafts for insertion between the clutch and transmission are also furnished. In these a coiled spring is also provided for taking up slack and preventing rattling. In one type of these double joints a leather boot extends from the housing of one joint to the other. The Hartford Auto Parts Company have recently issued a catalogue containing drawings and dimension tables of all of the different types of joints manufactured by them.

#### Another Motordrome Project.

The Monetary Realty Company has recently been organized in New York to handle a 6,000 acre tract of reclaimed New Jersey land near Hackensack. Among the incorporators of the company are P. S. Parich, Chas. Fish, Wilbur Fisk, Wm. G. McAdoo, Geo. Robertson, W. A. Post and Harold R. Gillette. It is said to be planned to construct a 3 mile automobile track.

### COMMUNICATIONS



## A Commercial Vehicle Driver's Experience.

Editor Horseless Age:

The following is a bit of my experience as chauffeur on a truck that may be of interest to your reader:

When I was introduced to my job, the machine, as left by my predecessor, was more like the proverbial scrap pile than anything else-most of it in one corner of a stable. It had been wrecked by one of the counterweights parting company with the crank shaft, a two throw with pins on the same side. The firm readily secured all replacements as required, for the truck had been purchased under some form of main-One of the curious tenance contract. things I early discovered was in connection with the mechanical oiler. It had five leads, and was operated from the cam shaft in the wrong direction by an irreversible ball ratchet. I reversed the position of the five ecentrics and the operating shaft, which, by the way, is no small job.

For the benefit of thise readers who are not familiar with this oiler, I will explain the peculiarity of these eccentrics. They are each in two parts, and are set in a plane not at right angles to the shaft. In other words they "wabble." This causes a slight rotation of the plungers, which properly open and close the oil ports, and for a given setting the running direction is all important. From inquiries I made I found that this oiler was part of the original equipment that had been in use two years. There was evidence that it had been tinkered with, and I suppose some driver had had the temerity to take it apart. It is almost inconceivable that he would have gotten the combination together again, not in part, but in an entirely reversed order.

This would seem to suggest an inusual oil economy. But such was not the case. I found in the basement two barrels containing a light and heavy grade of machine oil. I was informed that the practice was to mix the two grades together as needed, and every morning before starting out pour a "fire pail" full of it over everything in sight in the crank case. A word about this case. The engine was horizontal. The case contained everything from where the cylinders bolted on up to and including the differential on the rear axle. It was an all spur gear drive with the lowest point under the differential, where the case was partly formed by thin sheet steel secured to side castings by button head screws. This was anything but an oil tight arrangement.

For two-thirds of the time the most persistent annoyance was caused by the failure of proper lubrication. It was some fime before I got the management to supply a good gas engine oil, and I had trouble with leaking oil pipes. After trying flexible

metallic tubing without success, I adopted a one-eighth inch gas pipe, making it up with plenty of elbows and unions. This gave the best satisfaction. M. F. BATES.

## Cause of Peculiar Motor Action. Editor Horseless Age:

I have a new four cylinder, 30 horse power car, and I would like to know what is the cause and remedy of the following trouble:

Often when I switch off the magneto or batteries to allow the engine to stop, and the motor is just stopped, a spitting noise occurs in the carburetor and the engine runs backward a number of revolutions with a horrible knocking. To start again it requires quite a good deal of cranking. When this backing does not occur the motor starts on the push button. The motor runs fine and develops fine power.

A. STEGNER.

[If the motor runs backward a couple of revolutions it is a sign that an explosion occurred in the cylinder when the motor had stopped or almost stopped. That the motor turns the reverse way is due to the fact that ignition occurs before the crank comes to the dead centre position. Very likely the charge is ignited by incandescent carbon on the cylinder walls. It is also

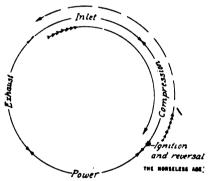


DIAGRAM OF CYCLE OPERATIONS.

possible that some part protruding into the cylinder gets so hot as to cause ignition of the charge. The swishing noise in the carburetor is explained as follows: Ordinarily the four strokes of the cycle are as follows:

Down stroke. Inlet. Inlet valve open Up stroke. Compression. All valves closed Down stroke. Power. All valves closed Up stroke. Exhaust. Exhaust valve open

Suppose that the ignition current has been turned off and the motor has almost come to rest. While nearing the end of the first up stroke or compression stroke the charge is automatically fired and the rotation of the engine is thereby reversed. (See accompanying sketch.) The valve functions then follow each other in the reverse order, and each stroke is reversed; that is, the piston moves up while the inlet valve is open and down while the exhaust valve is open. The force of the explosion toward the end-of the compression stroke forces the piston down. During the next

up stroke the inlet valve is open, and the engine therefore exhausts through the carburetor. This explains the swishing noise in the carburetor. During the next down stroke the exhaust valve is open and the engine draws in a charge of burnt gases from the muffler. This explains why it must be cranked for some time after it has stopped in the above described manner before it can be started again.

In order to remedy the trouble you should thoroughly clean your combustion chamber and piston head walls of carbon and see to it that the water circulates properly and keeps the engine cool.—[5,6]

#### Queries From a User.

Editor Horseless Age:

I would be pleadsed to have a few questions regarding ignition, etc., answered in your columns:

- I. Why is it that vibrators are not required on some coils?
- 2. Explain how a spark of the proper thickness and heat is produced by a non-vibrator coil.
- 3. Which is better, a four unit coil or single unit coil and distributor?
- 4. Number the four cylinders of a car, beginning in front. That is, which is 1, 2, 3, 4?
- 5. Does a sliding gear grow quieter with usage, as some operators claim, or more noisy?

  A. C. K., M. D.

[If the timer contacts are of such construction as to produce a quick, sharp break of the circuit, this will cause a sudden interruption of the current flow in the primary winding of the coil, which will cause a strong current impulse to be induced in the secondary, and thus a spark produced. Nonvibrator coils are usually used in connection with special contact devices or timers. There is this difference between the action of a vibrator coil system and a system comprising a plain or non-vibrating coil, that whereas with the former the spark in the cylinder occurs a certain fixed time after the contact in the timer is made, with the latter a spark occurs a certain fixed time after the contact in the timer is broken

The spark is produced in the non-vibrator coil in exactly the same way as in the vibrator coil, viz., the dying down of the current in the primary winding (due to the breaking of the circuit at the vibrator in the one case and in the timer in the other case) has an inductive effect on the secondary winding of the coil. What is most essential to a strong induction in the secondary winding of the coil is a quick cessation of the current in the primary winding. This is brought about by the condenser, which is connected across the vibrator in a vibrator coil system and across the interrupter or timer in a non-vibrator coil system.

Whether a four unit coil or a single unit coil and distributor is better depends largely upon the qualities of the distributor. In earlier years the multiple unit coils were generally used, because it was then found exceedingly difficult to insulate high tension distributors so well as to make them reliable under all weather conditions. You will understand that the problem of insulating currents of such high voltage as to jump threequarter inch gaps in the atmosphere is a very difficult one, but it has now been satisfactorily solved. With a first class high tension distributor we should prefer the single coil and distributor system, because it is less expensive in the first place, and there are fewer parts to be kept in adjustment. The very fact that high tension distributors are used on all high tension magnetos shows that it is now possible to make these distributors so as to work reliably.

If we wanted to number the cylinders of a four cylinder, conventional type vehicle, we would call the most forward one No. 1, the following one No. 2, the following one No. 3, and the most rearward one No. 4. The cylinders may then fire in one of the two following orders, viz., 1, 2, 4, 3 and 1, 3, 4, 2.

The sliding gear may grow either quieter or more noisy with use. If the teeth should not have been cut perfectly it is conceivable that they will wear in with use and mesh more perfectly after the car has been in operation for some time. However, if the gears were cut perfectly in the first place, the gear will most likely grow noister as it grows older, owing to the fact that after the teeth are worn below their normal thickness they will not mesh so perfectly, and as the bearings become worn it becomes possible for the gears to shatter in operation.—En.]

#### Ignition Wiring.

Editor Horseless Age:

I have been a reader of your paper for more than four years, and never asked a question before. I would be pleased to have you give me wiring diagrams for a four cylinder, two cycle engine (a) when a magneto and a battery are used (the battery for easy starting) and (b) when a magneto is used only. How do you switch over from the battery to the magneto?

J. G. Allen.
[In a four cylinder, two cycle engine
there are four explosions during each revo-

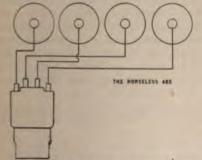


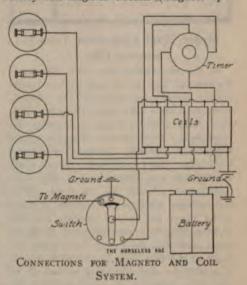
DIAGRAM OF MAGNETO CONNECTIONS.

lution of the crank shaft, consequently the explosions follow each other at intervals corresponding to one-quarter crank shaft revolution, or one-half piston stroke. This necessitates placing the cranks on the quarter. The cranks may be arranged in different ways, but in some four cylinder, two cycle cars on the market they are arranged so the cylinders fire in the order 1, 3, 2, 4. This means that cranks 1 and 2 are opposite or at 180 degrees with each other, and cranks 3 and 4 the same.

The wiring for the magneto alone is extremely simple. Simply connect the four high tension terminals of the magneto to the four spark plugs, making sure to connect the proper terminal to the proper plug. This can be done by noting that when the rotating arm of the high tension distributor of the mageto makes contact with one of the terminals the piston in the cylinder to which this terminal is connected must be near the top of the stroke. Presuming that the cylinders fire in the order 1, 3, 2, 4, the connections are made as shown in the accompanying sketch. The magneto has also one primary binding post from which a wire is brought to a switch on the dash or steering wheel. By means of this switch the primary winding of the armature is short circuited when it is desired to cut out ignition. One terminal of the switch is grounded and the other connected to the primary terminal on the magneto.

You also want to know the method of connection when a battery is used in connection with the magneto for easy starting, and in your sketch you show a Bosch DR4 magneto. We presume that you have one of the latter magnetos, but that it is not made specially for "dual" ignition. In order to use batteries in connection with the magneto you require the following extra parts: A non-vibrator coil for the battery; a contact breaker for the battery and a switch for switching over from the battery to the magneto, and vice versa. The magneto requires certain alterations to adapt it to use in connection with batteries. A double circuit breaker must be fitted in place of the single circuit breaker, and the high tension distributor must also be altered. The Bosch Magneto Company also make a special combined switch and coil, and as these are specially designed for use with their magneto, you will probably be best advised to get these parts from them. They also issue a booklet giving a diagram of connections.

If you have room for two sets of spark plugs in your engine (you might, of course, screw the spark plugs into T fittings screwed into the spark plug holes in the cylinders), you can use two entirely separate systems of ignition, and this may be advantageous if you already have a coil equipment and want to use that. In that case the magneto is connected to its plugs exactly as though it alone were used. The battery system, supposing that you are using four vibrator coils, could be arranged as shown in Fig. 2. As regards timing, it might be advantageous to have the magneto spark occur at a fixed time and only connect the battery timer to the spark lever. You would have to use a combination switch which in one extreme position would establish the battery circuit and ground the magneto armature (battery operation), in the other extreme position open both the battery and magneto circuits (magneto op-



eration), and in the mid-position open the battery circuit and ground the magneto circuit (stopping),—En.]

#### Importance of Carburetor Throttling Resistance.

Editor Horseless Age:

Referring to the article on "Calibrated Carburetors," by Frank H. Ball and Fred O. Ball, in your August 4 number, will you not kindly explain in an early number the significance of "the throttling resistance at full power," and why it is important to have this as low as possible?

G. H. T.

[When operating at full power it is important to get as much charge as possible into the cylinder during each suction stroke, The maximum charge is evidently equal to the displacement volume of the piston filled to atmospheric pressure. When the engine is pulled down in speed by a heavy load while running with the throttle fully open nearly this amount of charge may be taken into the cylinder, but at the comparatively high speed at which the engine delivers its maximum power there will be a considerable reduction in the quantity of this charge, owing to the resistance of the inlet pipe and carburetor passage. This reduction in charge, which it is desirable to keep as small as possible, increases with the length of the inlet passage and with the speed of revolution of the engine and decreases with the cross sectional area of the inlet passage. The throttling resistance is a measure of this reduction of the charge.

The Xargil Manufacturing Company, of Utica, N. Y., on October 1 will move into their new plant, a three story brick building at 34-38 Broadway, formerly occupied by the Eureka Mower Works. In the new plant the company will have sufficient capacity for turning out 200,000 mufflers a year.

# Commercial Applications.



# Motor Mail Collection Trial in Kansas City.

At the request of the First Assistant Postmaster General a test of the motor car as a collector of mail was recently made in Kansas City, Kan., the automobile used being a 28 horse power Franklin, offered by L. A. Robertson, manager of the Franklin Automobile Company, of Kansas City, Mo. Two collection routes, along which were 150 letter boxes widely scat-tered, were selected for the trial. With the ordinary methods of collection it takes seven hours and twenty minutes for two men and two horses to cover this combined route, and with the motor car a start was made at the City Hall at 5 o'clock, and at 7:40 o'clock, after the lapse of two hours and forty minutes, the collector had returned to the post office for the last time. The distance covered was approximately 35 miles, and a stop was made at each of the 150 boxes. This saving of four hours and twenty-five minutes in the collection of mail on the two routes was made in a test conducted by H. J. McKinnon, city superintendent of carriers.

# Motor Ambulance for Harrisburg, Pa.

We illustrate herewith the motor patrol and ambulance recently placed in service by the city of Harrisburg, Pa., replacing its former horse equipment. The vehicle was built especially for the purpose by Thos. B. Jeffery & Co., of Kenosha, Wis., and contains a larger frame, heavier axles, heavier springs and larger wheels and hubs than the standard Rambler cars. It has a four cylinder, 45 horse power motor, 123 inch wheel base and 35x5 inch tires. The interior is so arranged that it is possible to accommodate four injured people at one time,

as well as several attendants. The equipment consists of three stretchers, two of which are for ordinary work and one stair stretcher which can be used in carrying a patient around a winding stairs without any danger of jarring. The inside is finished in birdseye maple and hardwood, so that the body can be scrubbed and kept perfectly sanitary and clean. A large electric dome supplies illumination.

# Commercial Notes.

The Autocar Company has contracted for fifteen more cabs to be delivered to the Baltimore Taxicab Company early in October.

A motor bus service has been inaugurated between Washington and Marianna, Pa. A twelve passenger machine is used, and one round trip is made per day.

A McIntyre light delivery truck, equipped with a special refrigerator body, has been purchased by Dogan & Deffry, proprietors of a large meat market at Kenosha, Wis. It will be placed in use October 15.

The Long Beach (Cal.) Transfer Company has recently placed in service a rapid motor truck of 4,000 pounds load capacity, for service between Los Angeles and Long Beach. The truck is built with a four cylinder, 35 horse power motor, and makes the trip between the centre of Los Angeles to Long Beach in two and one-half hours with load.

The Berks Auto Transit Company, of Reading, Pa., have established an automobile service between that city and Millersburg, a distance of 25 miles. The company have been operating a service between Reading and Bernville for some time, and have now extended the line 11 miles to Millersburg, through Strausstown, Rehrersburg and Schaefferstown.

A sightseeing company is planning to run motor buses in Rock Creek Park, D. C., and has applied for a permit to the commissioners. The type of buses which it was at first proposed to place in service were considered too heavy by the engineer department, and Commissioner Judson is

at present making inquiries in New York and Philadelphia with regard to the type of vehicles in service in Central and Fairmount parks.

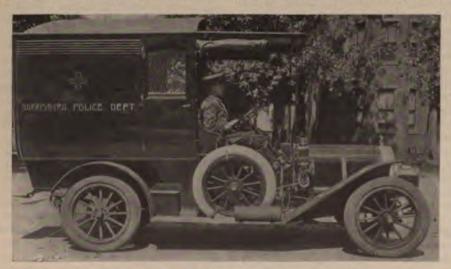
# Parts Exhibitors at Atlanta Show.

For the Atlanta Automobile Show, which opens November 6, forty members of the Motor and Accessory Manufacturers' Association have taken space. The allotment of space to them was completed at headquarters, on September 22, by the show committee of the M. and A. M. Following is a list of those that have taken space: Ajax-Grieb Rubber Company, Badger Brass Manufacturing Company. S. F. Bowser & Company. Byrne, Kingston & Company Connecticut Telephone and Electric Company. Diamond Rubber Company. Joseph Dixon Crucible Company, Dow Tire Company. Electric Storage Battery Company. Empire Tire Company. Federal Rubber Company. Firestone Tire and Rubber Company, The Fisk Rubber Company. G & J Tire Company.

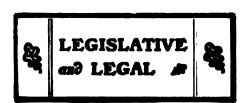
B. F. Goodrich Company Gabriel Horn Manufacturing Company. Goodyear Tire and Rubber Company. A. W. Harris Oil Company. Hartford Rubber Works Company. Herz & Company. Kokomo Electric Company. Jones Speedometer Company. Leather Tire Goods Company. C. A. Metzger, Michelin Tire Company. Morgan & Wright. National Carbon Company. Never-Miss Spark Plug Company. New York and New Jersey Lubricant Company. Oliver Manufacturing Company. Randall-Faichney Company. Republic Rubber Company. C. A. Shaler Company. Stromberg Motor Devices Company. High Wheel Auto Parts Company. C. F. Splitdorf, Sprague Umbrella Company. Veeder Manufacturing Company. Weed China Tire Grip Company. Hartford Suspension Company.

# To Test Taximeters in Massachusetts.

As numerous complaints have been made about the inaccuracy of taximeters in use in Massachusetts, D. C. V. Palmer, State Commissioner of Weights and Measures, has taken the matter under advisement, with a view to formulating some plan for their inspection and testing. Mr. Palmer recently returned to Boston from New York, where he looked into the matter from various points of view. While as yet nothing definite has been decided upon, the tests will probably be of a practical nature, rather than so-called bench tests. For this purpose it is planned to lay down an accurately measured course in each of the principal cities, I mile in length, this mile being divided into fourths and sixths, the units employed in the most used taximeter tariffs. This course is to be marked by bronze plates set in the curbstones and suitably inscribed.



RAMBLER PATROL AND AMBULANCE NOW IN DAILY SERVICE AT HARRISBURG, PA.



# Chicago Public Vehicle Drivers' Licensing Ordinance.

An ordinance has been introduced in the Chicago city council requiring all applicants for automobile drivers' licenses to pass a rigid physical examination before a board of automobile registry, which is to be composed of the city electrician, the health commissioner and the city engineer. The applicants must have the free and full use of their arms and legs, and be more than eighteen years old; must have good eyesight, and if they wear glasses the latter must hook over their ears; must have good hearing, be free from heart disease and fainting fits, and not addicted to the use of alcoholic liquors or injurious drugs; be able to guide machines through crowded streets. to turn suddenly and to quickly handle the machine in emergencies. Amendments have been suggested which require the reporting of every accident to the board of registry, and reports from garages of the names of the chauffeurs operating their machines during the day. Applicants who satisfactorily pass the examination, pay the examination fee of \$3 fixed by the ordinance and furnish a bond will be given a license. If the new ordinance should be passed it would apply to drivers of public vehicles only, as the State automobile law deprives the city authorities of the right to license private drivers.

# Another Spark Plug Patent Suit.

Joseph H. Lehman, of the J. H. Lehman Manufacturing Company, 29 West Fortysecond street. New York city, has filed an application for an injunction against A. R. Mosler & Co., 163 West Twenty-ninth street, New York, for alleged infringement of United States patent No. 741,684, which was issued to Mr. Lehman on October 20, 1903, on an application filed February 6. 1902. A. R. Mosler & Co. state that they are advised by their counsel that the above patent is not infringed by the manufacture, sale or use of any of their spark plugs, and they are willing to defend at their expense any party against whom suit may be brought under the above patent by reason of the sale or use of their spark plugs.

# Indianapolis Street Traffic Regula-

An ordinance has been introduced in the Indianapolis city council to regulate street traffic in what is known as the mile square, or retail business district of the city. It provides that vehicles of any description shall not stand within the mile square in such a manner as to prevent the free passage of pedestrians or vehicles. This is designed to stop the practice of vehicles standing two

abreast in the business streets. The police have also recently adopted a schedule of traffic rules for the streets.

# Milwaukee's Congested District Ordinance May Be Modified.

It is likely that the rule recently adopted by the Milwaukee (Wis.) common council to prohibit the use of Grand avenue and Wisconsin street, main thoroughfares, by automobiles and other vehicles for a longer period than necessary to discharge passengers or permit them to enter, will be modified. There is apparently no object in such restrictions during the hours from 9 o'clock in the evening until 5 o'clock in the morning, when traffic is light and danger of congestion is past.

### Ohio Supreme Court Against Municipal Auto Tax.

By a decision handed down by the Ohio Supreme Court in the case of Colter, a tax-payer, against the city of Cincinnati, it is declared unconstitutional for any municipality to enact an ordinance providing for licensing motor cars. That authority is wholly vested in the State, according to the decision. The case was appealed from the lower courts, in which it was decided in favor of the city. The decision followed that given in the case of Frisbie vs. City of Columbus, which was the test case. The decision will save autoists thousands of dollars.

# Municipality Defies State Legislature.

Although the municipal court at Stevens Point, Wis., recently decided that State laws limiting the speed of automobiles in cities to 12 miles an hour and in the country to 25 miles an hour supersede all municipal ordinances, the city of Plymouth, Wis., has passed an ordinance with a speed limit of 8 miles an hour.

The board of governors of the St. Louis Automobile Manufacturers' and Dealers' Association at a recent meeting indorsed a traffic regulation ordinance drawn up by S. D. Capin, president of the St. Louis A. C., which has been introduced in the City Council.

# Six Day Motorcycle Race Stopped Early.

A six day motorcycle contest organized by the Motorcycle Contest Association of New York, started on the Brighton Beach track, on Long Island, at 12:01 o'clock on Monday morning. Five teams took part, known respectively as the Harlem Motorcycle Club team, the New York Motorcycle Club team, the Bedford Park Motorcycle Club team, the Brooklyn team and the Flatbush team. Very fast time was made on the first day, but the race was called off on the second day owing to the continuous rain, which made the track slippery and dangerous. The attendance on the first day was small.

# Mr. Couzens' European Impressions.

James Couzens, secretary and treasurer of the Ford Motor Company, with Mrs. Couzens, returned on the steamer Coronia September 21, after a six weeks' trip to England, France, Germany and Switzerland. He says that American cars to be sold on the other side will have to be pushed in energetic fashion, for the trade outlook there isn't nearly as encouraging as it is in this country now.

"No American maker should look for foreign trade with the idea that it is going to be obtained easily," said Mr. Couzens. "While one always likes to take an optimistic view, I don't like to say that there is going to be a rush for our American cars over there when such a statement would be deceiving.

"There is an opportunity abroad to sell a great many American cars, and the number to be sold will constantly increase. In order to obtain the business, however, conditions over there must be carefully considered, and trade cared for in European fashion. We have sold 115 cars in France this year, which far exceeds anything accomplished by any other American company. Our agent, Henry De Passe, has ordered 300 cars for 1910. The French expect a great deal from the Darracq Company, which is making a 20 horse power, four cylinder car to sell at \$1,000. You know the Ford over there sells at \$1,200. The French makers are looking for an increase in their tariff as a protection for their industry.

"In London we have established a branch at 55-59 Shrewsbury avenue. The Ford is in great favor among Englishmen, and we look for a large increase in our trade there next year.

"I combined a little pleasure with my business trip, doing some touring in the Ford car through the Château country in France. Automobiling over there on the magnificent roads is certainly a luxury, and I can well understand why everyone talks of touring Europe. The scenery, the roads, the accommodations are all excellent.

"Automobile trade conditions on the other side are getting better, although they have had no such year as we have had in America. The recovery in the motor car trade has been slow, whereas here we have not noticed the slightest kind of a falling off, but, on the contrary, the demand seems to be increasing."

# A. O. Smith Company Increases Capital.

The A. O. Smith Company, of Milwaukee, Wis., one of the largest manufacturers in the world of pressed steel automobile frames and parts, has increased its capitalization from \$500,000 to \$1,200,000. The additional issue is to cover the new \$500,000 plant that is being erected on Keefe avenue, between Twenty-seventh and Thirtieth streets, Milwaukee.

# GARAGE ITEMS



#### A Tent or Portable Garage. By H. H. Brown.

It often happens that the owner of an automobile may wish to have the same near at hand in some more or less isolated place where no garage, barn or other shelter is available, as at a camp of a more or less temporary character. A simple but ingenious idea, which was devised by an automobilist of Chicopee Falls, Mass., for housing a large touring car while wintering in Florida, furnishes a rather good solution of the problem. It consists in using an ordinary wall tent, which in this particular case is 18x18 feet. A spike similar to that in the tent poles is driven into the front end of the ridge pole, and this fits into two holes in a pair of diagonal poles or shears. These are reinforced where the pin passes through with galvanized sheet iron. In this simple manner the whole front of the tent can be opened for the passage of the machine. The ends of the diagonal poles are braced against tent pegs. It can readily be seen that this idea may be applied to almost any sized tent which may be available for the purpose and which is large enough to accommodate the machine to be housed.

# New Indianapolis Garage.

A new garage has recently been opened on North Illinois and Twenty-second streets, Indianapolis, Ind., which is known as the "Twenty-second Street Garage." The business is conducted by A. L. Duggan, manager, and C. W. Allison. This is quite an imposing structure, the outside being of terra cotta, with three large show windows facing Illinois street and one large one facing Twenty-second street. The north or Twenty-second street side is one uninter-

rupted line of glass, but the sash are placed well above the ground, making it very light inside but shutting out the public view.

There are two entrances, both on Twenty-second street, one at the front and one at the extreme rear. Every convenience for the storage and care of cars is being installed. A Bowser gasoline pump is located at the left of the rear entrance, and next to this are the tanks containing the several grades of oil. A card system for tagging the supplies and repairs will later be introduced with a view of making every appointment up to date. The main building is 50x150 feet. It is veneered on the inside with one course of brick, while the outside is, as before stated, of terra cotta. The floor of the entire lower story is cemented and the building has a flat roof overhead. The office is located in the front, facing Illinois street. A building to contain repair shop, the heating plant and vulcanizing room is being erected at the rear. It is 36x40 feet and two stories high, of the same construction as the main building.

Electric power will be used in the shop and for charging batteries.

# Premier Agents' Convention.

The annual meeting of agents of the Premier Motor Manufacturing Company was held in Indianapolis last week, thirtytwo agents attending from all parts of the country. It continued three days, including a run to French Lick to demonstrate the running ability of the company's 1010 models. On Tuesday the agents visited the factory and listened to talks on the construction of the 1910 cars. In the evening a banquet was given at the Denison Hotel. Those who were on the program to speak were President H. O. Smith, Mayor Charles A. Bookwalter, Henry Eitel, president of the Indiana National Bank; P. J. Stocker, who spoke on advertising; R. I. Eades, Webb Jay and Charles Davis, field men for the company; John B. Oram, advertising manager and R. W. Macy, sales manager. The run to French Lick and return was without special incident. After returning Thursday afternoon a trip was made to the Indianapolis Motor Speedway, a dimer was given at the Country Club and the meeting closed with a theatre party

# Motor Manufacturing Company Organized in Hartford, Conn.

The Parker Motor Company has been organized at Hartford, Conn., with an authorized capital of \$50,000, to manufacture automobile motors, primarily for the McCar Company, of Hartford, who manufacture the McCue car. L. D. Parker, one of the directors of the McCue Company, is president and treasurer of the new company; C. T. McCue, president of the McCue Company, is vice president, and F. C. Billings, vice president of the McCue Company, is secretary of the Parker Motor Company. The new company will occupy the plant of the Springfield Elevator and Pump Company on Windsor street. It is planned to build a four cylinder, four cycle engine with valves on opposite sides. A production of 3,000 engines is planned for the first year. Special machinery is now being installed, and motors will probably be turned out before the first of the year. The McCue Company will act as distributing agents for the Parker Motor Company.

# Pope Report Shows Large Earnings.

The Pope Manufacturing Company las just filed its first report since its re-organization, which covers the period from December 24 to July 31. It shows income from operations after deducting costs, expenses, depreciations, etc., of \$462.815. Other income amounted to \$58,028, bringing the total income up to \$520,844 Charges, organization expenses, etc., amounting to \$37,977 left net earnings of \$482,866. The president's report shows that the company has borrowed no money for any purpose since beginning business under the reorganization, and taken advantage of discounts for cash payments in buying material, so that the only indebtedness at the close of the year was current bills. He also emphasizes the showing made in the payment on July I of \$800,-000 notes issued at the time of the reorganization, without encroaching on the working capital.

# Another Detroit Manufacturing

Company.

The Warren Motor Car Company has been organized at Detroit with a capital stock of \$100,000 to manufacture automobiles. At the head of the company is Postmaster Homer Warren. The other incorporators include C. R. Wilson, of the Wilson Body Company; Harry N. Snyder, manufacturers' representative for Michigan for Michelin tires; R. J. Brennan, W. H. Bradford and Henry C. Walters. The firm plans to manufacture light cars.



A PORTABLE TENT GARAGE.

The Frank A. Munsey Tour.

Although it was announced that 37 cars had been officially entered for the Frank A. Munsey Reliability Run, only 25 cars started in competition from Washington, D. C. on Tuesday, September 21. These were accompanied by two non-contesting cars, four official cars and three press cars, making 34 vehicles in all. The first day's run was to Philadelphia by way of Baltimore. Fourteen of the contestants came through the first stage with perfect scores. All of the cars were lined up in parking space in City Hall square, Philadelphia, where they remained over night, while the drivers and officials stayed at the Hotel Walton, Those who made perfect scores were No. o. Maxwell; No. 26, Reo; No. 12, Pullman; No. 32, Washington; No. 37, Pullman; No. 24, Crawford; No. 11, Maryland; No. 18, Corbin; No. 13, Harmon; No. 36, Elmore; No. 13, Pullman; No. 21, American Simplex; No. 28, Renault and No. 17, Croxton-Keeton. Most of the penalties suffered by the other II cars were small, however. No. 20, Winton, was penalized 4.1 points for lateness in starting and for adjusting the carburetor before starting the motor. No. 27, Matheson, was penalized 0.4 point for tightening a hub cap. No. 7, Ford, had 1.7 points imposed upon it for carburetor adjustment and stopping of motor. No. 5, Washington, was penalized 0.2 point for repairs to a fender, and No. 31, Washington, 0.1 point for stopping of the motor. No. 15, Columbia, lost 0.1 point for adjusting the brakes. No. 16, Croxton-Keeton, was penalized 0.5 point for stopping of motor and work on same. No. 14, Spoerer, was penalized 0.3 point for oiling the clutch. No. 29, Hupmobile was penalized 0.2 point for adjusting the oiler rod. No. 1, Chalmers-Detroit, received a penalty of 0.2 point for stopping of motor and fastening up the mud pan. No. 34, Selden, was penalized 0.2 point for tightening a fan bolt and for stopping of the

During the evening a meeting of the drivers and observers was held at which the observers' cards were taken up in rotation by Manager Trego, and every observer was asked to explain in detail any remarks on the cards that were not absolutely plain.

On Wednesday morning the cars started from the Hotel Walton at 9 o'clock en route for Milford, Pa. The two pilot cars had left two hours earlier. All of the 25 cars which started in the first day's run also started on the second stage and were sent off at one minute intervals. This day's route led through a very picturesque section through Eastern Pennsylvania. The roads were in perfect condition, a rain during the night having completely laid the dust. The tourists were met at the Manhattan Inn between Allentown and Bethlehem by the Lehigh Valley Motor Club, by whom they were treated to a lunch. The cars arrived at Easton, one of the checking stations, shortly before I o'clock. This day's run was somewhat less eventful than the first day's run. No. 15, Columbia, had an accident at Allentown, Pa., skidding on a slippery street and crashing into a telegraph pole, whereby both of the front wheels were wrenched off. No one was injured, however, and it was the intention to repair the car and continue the run. The scores for the day were announced by the committee as follows: Those penalized were: Ford, 0.3 point; Washington, No. 5, 0.1 point; Washington, No. 31, 0.1 point; Pullman, No. 37, 3.6 points; Chalmers-Detroit, 1.5 point; Croxton-Keeton, No. 16, 4.3 points; American Simplex, 0.1 point.

Those making clean scores were: Maxwell, Reo; Pullman, No. 12; Crawford; Washington, No. 32; Maryland, Spoerer; Croxton-Keeton, No. 17; Winton, Marmon, Elmore; Pullman, No. 13; Matheson, Renault, Hupmobile.

On Thursday the run was continued to Albany, N. Y. All of the contestants got away from Milford on time. There were two checking stations en route, at Newburgh and Kingston, respectively. Lunch was taken at Kingston. The route led along the west bank of the Hudson. The tour reached Albany late in the afternoon and the contestants put up at the Kenmore Hotel. Mayor Snyder, of Albany, Deputy Commissioner Rice and several others welcomed them at Kenmore and escorted them to the city. Before proceeding to the hotel the participants in the run stopped at the market square, where they were received by Secretary Howard B. Martin of the Albany Automobile Club and other members of that organization.

The roads encountered during the day were quite muddy, and this in connection with the fast schedule required wrought havoc with the perfect scores, so that only six of them were left at the end of the day. Several accidents were reported. The Maryland car No. 11 was ditched a short distance out of Albany, owing, it was said, to its steering gear becoming locked. Jesse L. Cassard, an official of the tour, who was one of the occupants of the car, was thrown out, but escaped without injury. Efforts were made to get the car back onto the road, but up to a late hour they had not been successful. The Washington No. 5 also met with an accident and did not report at Albany. The same is true of the Pullman No. 37, but the occupants of both of these cars expected to have been in shape again to start on the run to Boston the next morning. The penalties incurred during the day were as follows: No. 29, Hupmobile, 0.4 point for work; No. 26, Reo, 4 points for late arrival; No. 12, Pullman, 36.7 points for work, 0.6 point for cost of material, 30 points for lateness; No. 24, Crawford, 0.4 point; No. 31, Washington, 0.2 point for work, 31 points for lateness; No. 32, Washington, 0.2 point for work, 2 points for lateness; No. 16, Croxton-Keeton, 0.9 point for work, 0.2 point for cost of material; No. 27, Matheson, I point for work, 0.1 point for cost of material, No. 15, Columbia, was penalized 382.7 points in connection with the accident the previous day, of which 25.7 points were for work, 3 for cost of material, and 354 for lateness at Milford.

Friday's run was from Albany to Boston and the last half of it was made in a drenching rain. There was only one checking point en route and that was at Worcester. The day's run ended at the Bay State A. C. on Hemenway street, and the tourists put up at the Hotel Somerset. Manager Trego decided not to examine the observers' cards on Friday night and the scores became available only Saturday, Because of the heavy rain an attempt was made to arrange to place the cars in a garage, but none was available that was large enough to accommodate them all, and the result was that they were parked at the point originally planned, to the west of the Somerset.

On Saturday the contestants made a visit to Fort Warren, enjoyed a dinner in the Relay House and in the evening returned to their hotel in Boston. 'It had been planned to stop two full days in Boston but a different plan was formulated on Sunday morning. A meeting of the contestants was called at 11 o'clock and it was decided by unanimous vote to leave early in the afternoon for Willimantic, Conn. The chief reason for this quick departure was that early Sunday morning the officials received a message from Willimantic stating that a bridge on the schedule route near that city was down, and that it would be necessary to take a ten-mile detour. It was decided to stop overnight at the Hooker House, Willimantic. This day's run was 107 miles. Some difficulty was experienced in getting all of the drivers together, but when all had finally been reached the cars were driven to the White garage on Newberry street, where gasoline and oil were taken on. From here they went directly to the Bay State Automobile club at the Hotel Carleton and were checked out. Chairman Trego's National car left at 1.28 and was followed a few minutes later by the first contesting car and at one minute intervals by the others, until the last car ready was checked out at 1.54. The start was made in a pouring rain. In the trip to Willimantic, 107 miles, a schedule based on an average speed of 18 miles per hour was laid down. All of the cars finished the run by 8 o'clock in the evening.

On Monday the run to New York was made without much difficulty, although it rained at intervals during the day. In the evening a banquet took place at the Waldorf-Astoria, attended by all of the contestants and by Frank A. Munsey, the organizer. Only one of the cars was definitely withdrawn at this stage, namely, the Selden, whose driver was urgently called to New York while the cars were up in New England.

Twenty-one cars arrived in Philadelphia on Tuesday evening after a 195 mile trip from New York via Atlantic City. Referee Trego announced there that the standing of the cars would not be announced again until after the final examination at the conclusion of the run in Washington. Six of the cars checked out from Boston Sunday afternoon with perfect scores, namely, the Maxwell, one Croxton Keeton, Marmon, Elmore, Pullman and the Renault.

# To Manufacture Cars in Richmond, Ind.

The Pilot Motor Car Company, of Richmond, Ind., have been incorporated under the laws of Indiana with \$100,000 capital. They will manufacture a 30-35 horse power four and five passenger car to sell fully equipped with top, glass front and speedometer for around \$2,000. The new firm will occupy the building formerly occupied by the Kramer Manufacturing Company, on Fort Wayne street. The building is of brick and has a very large floor space, part of it being two stories high. The incorporators are George E. Seidel, Clarence H. Kramer and Horace M. Kramer. Operations in the new location will begin in about thirty days. The experimental work is being done at present at the Seidel Buggy Company's plants.

### Twenty-four Hour Race Postponed.

The twenty-four hour race which was to have been held on the Brighton Beach track on Long Island on Friday and Saturday of last week was prohibited by the police at the last moment, owing to the dangerous condition of the track, due to two days of more or less continuous rain. The management of the race protested vigorously against the police interference, as it had been announced that the race would be held "rain or shine," but the protest was of no avail. The race may be held at some future date, possibly October 14 and 15.

### Club Notes.

An automobile club is being formed at Eau Claire, Wis. Many owners there are members of the Wisconsin State A. A., affiliated with the A. A. A., and wish to become more closely related to each other. The draft of the proposed constitution states one object to be "to extend a welcome hand to the numerous tourists and visitors who daily pass through and stop in Eau Claire."

The Texas Automobile Association has been organized with headquarters at Houston. Among the objects of the organization are to drive out the "road hog" of every. class from the highways and to furnish free legal service to members, it being the intention to engage the services of an attornev in every important city of the State. The advisory board of the association consists of Col. J. W. Munn of Galveston, M. L. Mertz of San Angelo, Edwin J. Kiest of Dallas, E. J. Palmer of Houston, Col. Sam Park of Beaumont, G. W. Hawkins of Houston, E. H. Perry of Austin, and J. W. Link of Orange. The association plans to publish a hand book containing a list of members, a reprint of the State law and other useful information.

#### No Horseless Sunday for London.

About three months ago a member of the Westminster City (London) Council made the suggestion that in order to demonstrate the great usefulness of the automobile a part of London should be blocked to the entry of horsed vehicles of every kind, and that only motor vehicles should be permitted to perambulate for twenty-four hours the streets in the selected neighborhood. A Sunday in October was selected as being a period of the year when a more effective demonstration could be made, owing to people then having returned to town from their summer vacation. The publication of the idea received considerable encouragement from the majority of the newspapers, most of them giving it enthusiastic support without troubling to inquire too deeply into the merits of the scheme.

Now, to close the square half mile of London streets to all else but motor traffic would involve a policeman being stationed at every impinging street, and no chief commissioner who valued his position would dare to brave public opinion by issuing the necessary order, however great might be the influence and interest brought to bear upon him.

But the greatest obstacle that imposed itself upon the promoters was that of finance. When the scheme was first mooted the objectors wanted to know whether passengers in horsed vehicles-private carriages, cabs, omnibuses—together with any other horsed traffic, would have to go around the area to be barred to horses. Thereupon announcement was made that motor vehicles would be provided to transfer passengers, etc., across the district, and that such vehicles could be used free of charge, the cost of them coming out of a fund to be raised for the purpose by voluntary subscription. Further, the various companies operating horsed omnibuses were to be asked to keep their vehicles away from the neighborhood for the day, substituting their motor buses on the service. It was estimated that the cost of carrying out the scheme would amount to \$5,000. But no more than about \$250 came from a few parties who had axes to grind. Sundry meetings were held, to which were invited influential persons, who studiously kept away. The final blow came from two quarters: The omnibus companies refused point blank to have their traffic arrangements upset, while the most important person concerned, viz., the commissioner of police, regretted he could not permit constables to help the scheme.

# Italian Auto Finance to Be Investigated.

A sensational suit is at present occupying the courts of Turin, Italy. The president and three of the directors of the Fiat Automobile Company have been accused of falsifying the balance sheets of the company, of repeated fraudulent transactions and of inflating the value of stocks. It may be recalled in this connection that the

shares of the Fiat Company, which have a par value of 25 lire, were at one time quoted at the Turin Bourse at 2,800 lire, and that this apparent success of the Fiat Company induced a regular automobile promotion fever, in the course of which about 200,000,000 lire are said to have been invested in Italy in automobile companies. of which only a very few made a success, so that the greater portion of this capital was lost. The Attorney General has now brought suit against the president of the company and three of the directors. Whether there is any foundation for the charges can, of course, only be determined after the trial has been concluded.

#### The Riverhead-Mattituck Race.

A race for stock cars of five classes was held on a triangular course 22.75 miles long. between Riverhead and Mattituck, L. I., N. Y., on Wednesday, September 29, under the management of W. J. Morgan. The highways over which the race was held are of loam, and it proved to be the fastest course in the country. The best showing was made in Class 4, an event for cars selling between \$1,251 and \$2,000, over a distance 113.75 miles long. This distance was covered by a Buick, driven by Louis Chevrolet, in 97m. 36 3-10s., at an average speed of 70 miles per hour, which is a record for this country. Event No. 1, for cars selling at \$4,001 and over, was won by Ralph de Palma in a Fiat. The distance was 227.5 miles, and this was covered in 218m. 35 6-10s. The winner in Class 2, for cars selling between \$3,000 and \$4,000, was won by Frank Lescault in a Palmer-Singer "Six-Sixty." Lescault covered the 182 miles in 179m. 4s., or at slightly more than 61 miles per hour. Class 3 was won by William Sharp in a Sharp-Arrow, whose time for the 136.5 miles was 129m. 2s.., corresponding to a speed of 64 miles per hour. Chevrolet, as already stated, won in Class 4, and Class 5 was won by a Maxwell driven by A. See, whose time for the QI miles was 101m. 22s., corresponding to an average of 54 miles per hour. Class 5 was for cars between \$750 and \$1,251. One fatal accident occurred during the race. An Apperson car, driven by Herbert Lytle, skidded and collided with a tree during the first lap, hurling both its occupants from their seats. The mechanic, James E. Bates, died within an hour, and Lytle is hovering between life and death at this writing.

# Automobiles and Their Tires Are Dutiable as Entireties.

The Board of United States General Appraisers in overruling protests filed by Joseph Spiero and others declines to allow automobiles and their tires to be assessed at separate rates. Collector Loeb regarded the automobiles and their tires as entireties, with duty at the rate of 45 per cent. under the tariff provision for articles composed in chief value of metal. The importers alleged that the tires should be taxed 30 per per cent, as "manufactures of rubber."

# MINOR MENTION



The Hayes Wheel Company, Jackson, Mich., are breaking ground for another two story brick building, 200x70 feet.

The American Oil Company, of Jackson, Mich., at a recent meeting of its board of directors voted to double its capacity, and also to erect a two story brick office building.

The Spalding Carriage Company, of Grinnell, Ia., will manufacture a car to be known as the Spalding. The company will erect three new buildings for its auto department.

W. K. Dodsworth, formerly manager of the Central Garage, Pasadena, Cal., has established himself as a dealer in secondhand automobiles, with offices at 300 Chamber of Commerce.

The Krit Motor Car Company, newly organized at Detroit, are planning to turn out 1,000 low priced cars designed by Kenneth Chittenden. They will occupy the old Blomstrom factory.

The E. R. Thomas Motor Company, of Buffalo, N. Y., have contracted for Truffault-Hartford shock absorbers for their 1910 output. They have been fitting these shock absorbers for several years.

The bulk of the product of the Jackson Automobile Company, Jackson, Mich., this year will consist of four cylinder cars, of which they are planning to build 5,000. About 500 two cylinders will also be turned out.

It is announced that the Des Moines, Ia., plant of the Mason-Maytag Motor Car Company will not be shut down on November I, as was reported at one time, but will be continued by the company as a body factory.

The Rushmore Dynamo Works have recently erected a large fireproof storehouse, and will soon break ground for a two story fireproof concrete extension to their machine shop, 50x200 feet, giving them 20,000 square feet of additional floor space.

The Moline Automobile Company, East Moline, Ill., have let the contract for the erection of their new four story 100x127 foot addition. The building is to cost approximately \$40,000 and is to be ready for occupancy December 1.

The Rogers Automobile Company is being organized at Omaha, Neb., by Ralph Rogers and C. A. Overholt, of Chicago, Ill., with a capital stock of \$250,000. A factory site has been selected near the Ralston car shops. Mr. Rogers has been building cars in Chicago in a small way for some time.

The Stewart & Clark Manufacturing Company have leased for three years the quarters occupied by the Cadillac Automobile Company of Chicago, 1312 Michigan Avenue, and will take possession December I. The new quarters will provide a great convenience for city trade, as it will permit taking care of city orders promptly, avoiding the delays of handling the order through the factory.

John Clark, a garage man of Anderson, Ind., has secured a bonus from Shelbyville, Ind., and will locate a factory there for the manufacture of automobiles. Associated with him is Arthur Woodward, of Lapel, Ind.

The United States Motor Truck Company, recently incorporated under Ohio laws, plans to manufacture motor trucks in Cincinnati, and is now looking for a location. Trucks of one, two and three tons capacity are to be built.

Professor J. J. Montgomery, of Santa Clara College, San Francisco, is reported to have invented an alternating current rectifier applicable to charging automobile batteries. It is of the mechanical type, but no description is yet available.

The McFarlan Motor Car Company, of Connersville, Ind., plan to turn out a six cylinder car at about \$2,100. They will use a Brownell six cylinder power unit and Weston-Mott axles. The car will be equipped with four and five passenger bodies.

The dates for the Flag to Flag endurance contest from Denver to Mexico City have been fixed. The run will start from Denver on Monday, November 22, and will end in Mexico City the week of December 13. The finish in Mexico is to be followed by an exhibition there.

The International Harvester Company announces that the former plant of the Buckeye Mower and Reaper Company at Akron, Ohio, will be turned into a factory for motor cars. The cars will be of the buggy type. It is expected to turn out 30.000 the coming season.

Officers of the Rohrbacher Auto Power Tire Pump Company, of Blaine, Wash., were in Portland, Ore., recently in an endeavor to secure inducements for locating a factory there. The company manufacture power operated pumps for inflating tires, and H. E. Wells is the Oregon representative.

The Smith Auto Company, of Topeka, Kan., are planning to erect an assembling plant in Kansas City. The parts are to be manufactured in the Topeka plant, shipped to Kansas City and assembled there. This leads to a saving in transportation expenses, as parts can be shipped much cheaper than assembled cars.

The Fairfield Automobile Company of Baltimore, Ohio, whose incorporation we announced in a recent issue, have secured a brick building between Baltimore and Bayville, in which they will conduct a garage and repair shop. The company plan to work out several recent inventions and eventually to engage in manufacturing.

The Oakland Motor Car Company of Pontiac, Mich., have filed notice of an increase of capital stock from \$300,000 to \$800,000. It is also reported that the company have purchased four parcels of land north of the Pontiac, Oxford & Northern

tracks, measuring together 400x150 feet. It is not the intention to build immediately, but additions may be erected on the newly acquired property next year.

At a meeting of the Long Island A. C. at the club house in Brooklyn on September 29, a demonstration will be made in the garage of the practical working of demountable and detachable rims.

The Dodge Motor Vehicle Company, Irvington street, Boston, are compiling a booklet containing a complete list of the public charging stations in the cities and towns within a radius of 50 miles of Boston.

The Rainier Motor Truck Company has been organized in New York and will handle the trucks built by the Reliance Motor Truck Company of Owosso, Mich. The new company will offer purchasers a maintenance guarantee covering the operation and repair of the trucks for a number of years at a fixed yearly figure.

The Auto Specialty Manufacturing Company have started in business at 215-217 E. Ohio street, Indianapolis, Ind. They make a specialty of repairing leaky radiators, broken lamps, fenders, etc., and are also equipped for doing all kinds of machine work. The company manufacture a complete line of baby tonneaus, rumble seats, fenders and tool and battery boxes.

The Cuyahoga Motor Car Company, of Cleveland, Ohio, have sold out their gare je business and will confine themselves in the future to the manufacture of their storage batteries and electric vehicles. They have changed their name to the Cleveland Electric Vehicle Company. Quarters have been secured in the Standard Automobile Company's building on Huron street.

The New York Automobile Trade Association has postponed its Three-Day-Around Long Island tour which was to have taken place September 28-30. The A. A. A. refused their sanction for the event, because various stipulations embodied in the rules of the association were not included in the rules of the contest. The rules will probably be modified and the event set for a future date.

Articles of association have been filed by the Metzger Motor Car Company, Detroit, Mich., according to which \$250,000 of the \$300,000 capital is paid in in cash and \$50,000 is represented by the model and plans of a new four cycle, four cylinder car. Wm. E. Kelly, the designer of the car, holds 2,666 shares of stock, and the rest is held in equal shares by Byron F. Everitt and Wm. E. Metzger.

The Pierce-Arrow cars the coming season will be equipped with distinctively shaped lamps. The head lamps will all be of octagonal form, thus differing materially in shape from the usual round head lamps. On all open cars the side lamps will be square, while on the closed cars they will also be octagonal, with glass sides and front. These designs are due to the Pierce Company's art department. The side lamps are wired for the use of incandescent lamps, if the purchaser so desires.

Garage Notes.

Moses Gullusian, of Newton, Mass., will erect a \$65,000 garage in Lansdowne street, Cambridge, near Green street.

E. F. Sanford, Merced, Cal., has opened a garage in a new building on Main street, and will also conduct a repair shop.

Frank Sampson, Hollister, Cal., has bought the Loag Garage on Fourth street, together with the equipment, and will conduct a motor livery business.

H. J. Williams, Ashtabula, Ohio, has purchased an interest in the Auto Shop Co., of that city, and will have charge of the mechanical department of the firm.

The Cox Automobile Co., agents for Stoddard-Dayton and Herreshoff cars at Harrisburg, Pa., have moved into their new salesroom at 23 South Fourth street.

R. A. Fuller, of Sturgeon Bay, Wis., and Ed. Bellman, of Milwaukee, Wis., have bought the garage of Albert Wegmann. 108 Second street. Watertown, Wis.

The South End Motor Car Co., 24 East Concord street, Boston, Mass., are looking for the agency for some good medium priced car, preferably a two cycle one.

Dr. Hardin Reynolds and A. D. Reynolds, Jr., Bristol, Tenn., are erecting a two story 40x90 feet pressed brick building, the first floor of which will be use 1 40 a garage.

John O'Laughlin, Hays, Kan., has purchased a building site and will erect a garage thereon early next year. Mr. O'Laughlin has contracted for a number of Maxwell cars.

The Omaha Automobile Co. has decided to build a one story garage on Farnam street, between Nineteenth and Twentieth streets, adjacent to the company's present garage.

J. W. Hughes has purchased the Eureka Garage on Broadway, Seattle, Wash., the price paid being given as \$37,500. The location of the garage is on Seattle's automobile row.

The Studebaker Automobile Co., of Salt Lake City, Utah, are erecting a three story building at Second street South and Second street East, which will be finished in a short time.

H. O. Koller, Reading, Pa., will erect a three story brick and cement garage 29x230 feet, to cost \$18,000. It will be located on Fifth street, between Washington and Walnut streets.

The Midland Motor Car Co., of Moline, Ill., has established an agency in New York to be known as the Midland (N. Y.) Co., with premises at 1851 Broadway, in charge of J. M. Boyle.

The Escambia Motor Car Co., of Meridian, Miss., is building a new garage at the corner of Twenty-second avenue and Ninth street. The company handles the Oldsmobile and Interstate,

The Cloud Marts Co. have secured a lease on the store and basement at 1871 and 1873 Broadway, New York city, from the Welch Motor Car Co., of Pontiac, Mich. The store is to be used as an automobile sales com

as an automobile salesroom.

The Southern Motor Works, of Jackson, Tenn., have taken a twenty year lease on a property on Market street, and will at once commence the erection of a one story 100x114 feet garage, to cost about \$3,000.

F. S. Whitman and S. M. Storer, San Pedro, Cal., have taken a lease of the skating rink on Seventh street, which they will reconstruct as a garage. They have secured the agencies for the Chalmers-Detroit and Hudson cars.

The Albert Wegeman Garage at 106-108 Second street, Watertown, Wis., has been purchased by Edwin Bellman, of Milwaukee, and R. A. Fuller, of Green Bay, Wis. W. D. Francisco, of Fort Atkinson, Wis., has been appointed manager.

Jones' Garage at Mojave, Cal., was destroyed by fire on September 7, as was also one automobile in the place at the time. The loss is estimated at \$2,000. An adjoining garage was also set on fire and a six cylinder car in it was barely saved.

The Georgia Motor Car Co., agents for Stude-baker and E-M-F cars in Atlanta, Ga., of which George W. Hanson is general manager, have secured three additional stores adjacent to their former store, which will greatly increase their floor space.

The Peckham Motor Car Co., Dayton, Ohio, will move on October 1 into their new quarters at Second and Main streets, which are in the heart of the best residence district of the city. The company handles Peerless, Buick and Baker electric cars.

Agencies are being established in Wisconsin for the Fal car. by F. C. Van Sicklen, assistant sales manager for the Fal Motor Co., of Chicago. For the present, at least, the Milwaukee territory will be supplied by the Kopmeier Motor Car Co., 375 Summit avenue.

The Leigh Motor Co. has been organized in Leigh. Neb., by Gustav Hahn, H. P. Buhman and E.f. Wurdeman to take over the automobile business of S. B. Hosely. They will equip a modern garage and conduct a general garage business, handling the Maxwell and Studebaker lines.

The Elmore Motor Car Co. has been organized at New York city by George Post, who was formerly with Panhard-Levassor, and Peter Fogarty, one of the pioneer dealers in the city, who has recently been connected with George C. John. The new company will handle the Elmore in New York city and vicinity.

city and vicinity.

The Nebraska Buick Automobile Co. will erect a two story 75x135 feet building on Farnam street, Omaha, Neb., between Nineteenth and Twentieth streets. The building will comprise a salesroom 60x90 feet, and will probably be ready for occupancy before the end of the year. Lee Huff will manage the Omaha branch.

The Studebaker Co. of California has let the contract for a \$200,000 garage building, to be erected on Fremont street. San Francisco. The building will have ground dimensions of 275x87½ feet, and will run through to First street. The garage will be conducted as a regular public garage, and all makes of cars will be cared for.

The Mitchell agency in Milwaukee, Wis., conducted by the Browne-Friend Motor Car Co., and its successor, the G. W. Browne Motor Car Co., has been enlarged into a factory branch, and head-quarters have been established in a new building at 528-532 Broadway. The Browne Co. has taken on the Overland, and now carries the Marmon, Marion and Overland.

The stable of Kenny & Clark at the corner of Massachusetts avenue and Newburg street, Boston, Mass., is at present being transformed into a garage, and will be opened December 1 as the Charlesgate Garage. It is situated on the main artery of automobile travel from Cambridge to Boston. H. S. Merry, 121 Massachusetts avenue, will be manager of the garage.

An automobile building will be erected by Samuel Storrow, Pasadena, Cal., just south of the Hotel Green and west of the Santa Fé Railway station, at a cost of approximately \$25,000. The lower floor will be occupied by the Fair Oaks Garage, the Pasadena Taxicab Co. and the California Sightseeing Traffic Co. The second story will be leased for other purposes.

# New Incorporations.

The Wilmington Motor Car Co., Raleigh, N. C.—Capital stock, \$125,000. Incorporators, L. H. Simmons and A. L. Council.

M. S. Brigham Motor Car Co., Seattle, Wash.
—Capital stock, \$25,000. Incorporators, M. S.
Brigham and Caroline F. Brigham.

Royal Auto Co., Minneapolis, Minn.—Capital stock, \$50,000. Incorporators, I. A. Thorson, Lilian Thorson and E. G. Johnson.

Palace Automobile Co., Houston, Tex.—Capital stock, \$5,000. Incorporators, L. A. Pitts, R. P. Christian, J. F. Minton and others.

Excelsior Drug and Auto Co., St. Louis, Mo.— Capital stock, \$15,000. Incorporators, Gustav C. Menig, Anna Knipperberg and S. W. Jurgen.

The Auto and Aeronautic Supply Co., New York.— Capital stock, \$20,000. Incorporators, Percy A. Larter, Glen Ethridge and H. Chandler. Wordingham Auto Supply Co., Milwaukee, Wis.

-Capital stock, \$5,000. Incorporators, George D. Sheriffs, Wm. Wordingham and Thos. W. Sheriffs.

The Tate Gas Electric Motor Vehicle Co., Jersey City, N. J.—Capital stock \$100,000. Incorpo-

rators, John L. Tate, Chas. E. Tate and John L. Tate, Jr.

The New Albany Automobile and Carriage Co., New Albany, Ind.—Capital stock, \$5,000. Incorporators, L. C. Schwemberger, W. H. Thomas and Philip Scharf.

The Spring Tire Co., Los Angeles, Cal.—Capital stock, \$1,000,000. Incorporators, J. P. Magney, C. A. Bonnell, Edgar Sharp, J. N. O. Rech and Clem S. Glass.

United States Motor Truck Co., Cincinnati, O.—Capital stock, \$100,000. Incorporators, Harry L. Manss, Alfred Hill, H. B. Mackey, Jesse Lowman and Herman Erdman.

The Eastern Automobile Co., Bangor, Me-Capital stock, \$10,000. Incorporators, John H. Rice, Eben Leavitt, L. P. Swett, E. L. Miller, D. A. McLeod and J. F. Stevens.

California Electric Garage Co., Pasadena, Cal.— Capital stock, \$50,000. Incorporators, I. H. Stratton, A. W. Hookway, P. C. Dorland, C. H. Kay, R. C. Holbert and John Miliken.

The Bruce-Cubbins Auto Company, Memphis, Tenn.—Capital stock, \$10,00. Incorporators, N. S. Bruce, G. B. Malone, Jr.: M. M. McCallum, J. F. Cubbins & Kate F. Cubbins.

The Clark-Carter Automobile Co., Jackson, Mich.—Capital stock, \$100,000. Incorporators, H. E. Carter, F. C. Badgley, W. W. Clark, W. D. Thompson, L. H. Field, H. L. Hitch.ock, Geo. B. McQuellan, Claud McQuellan, Winthrop Withington, and Arthur Garland.

Ohio Electric Car Company, Toledo, Ohio.— Capital stock, \$75.000. Incorporators, Henry P. Dodge, Rathbun Fuller, Henry E. Marvin, James Brown Bell and Robert R. I.ee. To take over the business of the Ohio Electric Carriage Company, launched some time ago.

# Trade Personals.

Mr. Greenwood has bought out the interest of his partner in the Knapp-Greenwood Company, of Boston, Masa,

F. S. Jacobson has resigned from the Artizan Brass Company, Chicago, to accept a position on the Chicago American.

F. W. Lumsden, formerly local manager of the Ajax Tire Company in Seattle, Wash., has joined the Seattle branch of the Firestone Tire and Rubber Company.

H. S. Apperson, formerly sales manager of the Louisville branch of the Oldsmobile Company, has accepted a position as manager of the sales department of the Peerless and Knox agencies in Pittsburg.

A. F. Holden, who has been connected with the F. B. Stearns Company for six years, ever since he graduated from the Case School of Applied Science, has been appointed Western sales manager and will have charge of the territory between Salt Lake City and the Coast, Mexico and Canada.

F. H. Banbury, engineer of the Acheson-Oildag Company of Niagara Falls, N. Y., sailed for Europe on the steamer St. Louis on September 25. Mr. Banbury will look after the patent interests of the company in Europe. He will first go to Genoa, Italy, and later visit other countries to establish the Oildag process there.

# New Agencies.

Albany, N. Y.—R. M. Robinson, Reo. St. Louis, Mo.—J. M. Dunwoodie, Stearns. Marion, Ind.—Kent R. Wigger, Studebaker. Redlands, Cal.—Van Deventer Brothers, Ford. Los Angeles, Cal.—Frank C. Russell, Cadillac. St. Louis, Mo.—Oldsmobile Company, Oakland. Minneapolis, Minn.—A. G. Fitzgerald, Stearns. St. Paul, Minn.—A. E. Kelley, Stoddard-Dayton. Colusa, Cal.—Ruberts & Yerxa, Interstate Auto. Boston, Mass.—H. C. & C. D. Castle, Haynes. Portland, Ore.—Neate & McArthur, Locomobile. Grand Rapids, Mich.—Pantind & Bulkeley, Oakland.

Minneapolis, Minn.-Walter Rightmire, Stod-dard-Dayton.

Kansas City, Mo.—The Imperial Motor Co., Woods electric.

Kansas City, Mo.—The Long-Histed Motor Co., Overland, American Simplex.

# The Horseless Age

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# Steering Wheel Switches a Convenience in Driving.

BY ALBERT L. CLOUGH.

A provision for controlling the ignition from the steering wheel adds materially to the comfort and safety of driving, and may be utilized to reduce wear and tear on certain parts of the car mechanism.

#### RIM SWITCH.

Steering wheel ignition switches may be obtained in various forms. A simple button, set into the wood rim of the wheel, may be had, the pressure of which acts to interrupt the circuit, if battery ignition is employed or to short circuit the armature, if a magneto is used, thus acting in both instances to stop the motor while the button is pushed. The button may be included in the common circuit of both batteries, if two sets are installed, and with most dual magneto systems it may be cut into both the magneto armature circuit and the battery circuit so as to be effective, whichever system the engine is running on.

Several car manufacturers are fitting these buttons to their wheel rims as a regular part of the equipment, and, when this is done, the wiring is brought up through the steering column and out to the rim in a manner which insures good insulation, and is not conspicuous. The button switch is intended primarily to effect sudden and temporary interruptions of ignition.

### LOCATION ON SPOKE.

Another form of switch, which is arranged to be clamped to a spoke of the wheel, is connected to the ignition system by means of conductors, carried in a length of flexible metallic tubing, which runs down the column from the wheel, through the floor or dash of the car.

This arrangement can be made to accomplish much more than the simple push button, as it is a regular switch and can be furnished with sufficient contact points to accomplish all that is required, without becoming at all bulky. The metallic tubing offers sufficient room for the necessary conductors. Such a switch is connected in parallel with the dashboard switching arrangements, and can be so arranged as to change from battery or magneto to "off" on a dual system, or from battery or magneto to "off" in case two entirely separate systems are used. It can even be so arranged that the two systems may be used simultaneously, although there is rarely anything to be gained by this practice.

#### BEST SWITCH LOCATION.

Considering the question of ignition switching, from the broad standpoint of convenience and car control, it is a grave question whether the steering wheel is not the logical place for the regular location of switching devices. It is easy to see why this function has hitherto been relegated to the dashboard. Switches naturally constitute a part of the coils which they control, and considerations of accessibility and cleanliness have rendered the dashboard location of coils preferable in many respects. Where the coils are located, there the switches which form a part of their containing boxes are naturally to be found.

Aside from the switching which is done preparatory to cranking the motor, all movements of switches are accomplished while the operator is in his seat. With the large steering wheels and heavily raked columns now in use, together with recessed dashes and the liberal leg room usually provided, reaching for dashboard switches becomes awkward and often entails a certain loss of steering control,

The control of spark position being always located on the wheel, it is not plain why the ignition switching should not also be placed there, thus centring all ignition control.

Before cranking his car the careful operator's first action is to make sure of the setting of the spark lever, and to see that the throttle is open the proper amount, and if the switching were regularly performed from the wheel the extra movement to the dashboard would be obviated. Accidents due to a too early setting of the spark would be less likely to occur, as the operator, in operating the switch upon the wheel, would be likely to note the position of the spark lever. In starting from the seat, after a short stop, during which the operator has not left the wheel, no movement from the comfortable driving position would be required. Of course the use of kick switches renders this possible also.

From the writer's standpoint it would not be strange if the wheel became the standard and not the exceptional location for the switch, and it is certain that in cars thus equipped at the factory the wiring could be well insulated and the switching arrangements rendered unobtrusive and not liable to interfere with other features of the control.

#### IMPROVED DRIVING CONTROL

With ignition control at the finger and, by the use of a steering wheel switch, it is possible to slow down for every bad crossing and pitch hole, by cutting off the ignition, and speed may also be slackened in this way when sharp corners are to be turned.

In the absence of such ignition control the clutch must be thrown out and the foot brake applied, in order to secure the required reduction in speed. The wear and tear of the clutch and brakes and the clutch and brake operating mechanisms thus occasioned amounts to considerable in the aggregate, and as the engine turns over at increased speed when the clutch is disengaged, it and its connected auxiliaries are subjected to some extra wear. There is also some additional expenditure of fuel thus occasioned. By cutting off the ignition the engine acts as a very satisfactory brake, and no extra wear is entailed. Either the simple push button or the complete steering wheel switch suffices for this purpose.

#### CHANGING FROM MAGNETO TO BATTERY.

Very few magnetos are so adjusted as to run their cars on the high gear at a sufficiently low speed to make driving safe in crowded traffic or over very rough level roads. The battery systems of such cars usually provide a very much lower minimum speed. In order to drive on the magneto under such conditions the clutch requires to be almost constantly slipped, and there is thus a good deal of unnecessary wear and tear thereon. An operator will often resort to clutch slipping, and even to a change to a lower gear, rather than reach down to the dash and change from magneto to the battery and coil system. With a steering wheel switch a mere movement of the finger suffices to change from one system to the

### DESCENDING GRADES,

In descending slight grades cutting off the ignition will usually keep speed within safe bounds without brake application, and slightly steeper ones require only a slight touch upon the foot brake as an addition to the braking effect of the motor. If a button or a switch is provided upon the wheel the chances are large that engine braking will be taken advantage of, but if no such device is in use it is more than likely that the freeing of the clutch and the application of the brake will prove a "path of less resistance" than stooping down and manipulating the dashboard switch.

It is a revelation to many who have not tried it to observe how nicely the speed of a car may be controlled in descending quite a steep hill by throwing into second speed and alternately cutting off and throwing on the ignition. Such a descent as this makes serious demands upon the brakes if the motor is not used as an additional resistance. Reaching for the dashboard switch while descending a rough, winding hill is by no means conducive to safety.

To those operators who think more of saving gasoline than sparing their brakes the ignition cut-out on the wheel also appeals. When a long hill is to be descended the clutch may be thrown out and the switch on the wheel thrown to the "off" position, the car being controlled during the descent by means of the brakes. At the completion of the descent the switch is thrown on and the clutch gently engaged on the high gear, thus starting the motor.

#### IN MEETING HORSES.

When a restive horse is met with or any other emergency occurs which requires the stopping of the metor, the steering wheel switch renders this instantly possible, without necessitating, upon the part of the operator, any change of position which may jeopardize the control of the car. As soon as starting of the engine is again required the switch on the wheel provides for "sparking it up" on the battery system, if a double system is in use.

Motorists who make a point of driving as quietly as possible will appreciate the ability to throw off ignition from the wheel. When making a stop the ignition circuit may first be interrupted and the hand throttle somewhat opened, and before the car ceases to move the clutch may be disengaged and the car be finally brought to rest by the brake. A stop can thus be made more quietly than with the traditional "steamer" and the cylinders still be left well charged for the next start.

### REAR SEAT EMERGENCY SWITCH.

In connection with the matter of ignition control there is one more suggestion which, though not entirely novel, may well be made here, namely, that every closed car, and perhaps every large touring car, should be equipped with an emergency switch capable, when operated, of infallibly cutting of ignition from the motor. This switch should be accessibly located within the body of a closed car, and, if used in connection with a touring car, should be within reach of the tonneau passengers. The passengers of a closed car are practically helpless in regard to stopping the vehicle unless such a device is provided, and the same thing is in a measure true of the rear seat passengers of an ordinary car. In case of disability upon the part of the driver, when no passenger is sitting beside him, a closed car would run wild until its engine stalled from the collision of the vehicle with some obstruction or from the nature of the road. A driver may faint or be intoxicated, or may be struck and rendered unconscious by a piece of timber projecting from the rear of another vehicle, or some other unexpected accident may happen. If an emergency cutoff switch were to be provided, to be used only under serious circumstances, it would afford the passengers in a closed car protection which they do not now enjoy.

# Trend of European Trade for 1910.

BY ROY LINDSAY.

During the past four seasons I have each season summarized for the readers of this journal the course of trade and possible prospects for the succeeding year, and reviewing my efforts in this direction I believe these forecasts have proved to be substantially correct. Twelve months ago I made it pretty clear that the trade in very large powered pleasure vehicles could not be expected to exceed 71/2 per cent. of the total turnover of all the European manufacturers, and actual sales for the 1909 season just closing fully bear out that contention. It is useless to attempt any sort of comparison between the demand as between the United States and Europe, because the former country is only commencing to approach the maximum demand for the high priced car, while Europe reached that position in the spring of 1908. To generalize is easy, but I will endeavor, by adducing concrete facts, to show why considerable caution ought to be exercised by American makers in attempting to place any considerable portion of their output east of the Atlantic.

I observe that a prominent American manufacturer has, after a tour of the European factories, expressed certain opinions concerning the likelihood of future automobile business between the two continents, but I must beg leave to differ absolutely from the conclusions he draws. The European automobile trade is a very difficult one to understand, and to realize all that is going on requires the closest attention, even by those, like myself, who in their journalistic capacity have access to information denied to the public or to fellow competitors in the trade.

The manufacturer referred to remarks upon the prevalence of taxicabs in Paris. London and other large centres on the Continent. His observations are correct only with respect to London, the large English towns and Paris. In France, outside the capital city, a taxicab would have to be searched for. In Berlin, owing to local conditions which cannot be discussed here in detail, these vehicles are a failure. The total in use in all other German towns does not exceed 100, and they are non-existent in any other European city. Warsaw (Russia) has just placed an order with an English firm for six, solely as an experiment, that is not likely to succeed owing to the roughly paved streets of that city. London has over 3,000 taxicabs, and these are being added to at the rate of fifty a week, one company alone owning 1,600.

### MOTOR BUSES.

In London 1,078 motor buses are in use at the moment of writing. There are very few in Paris, probably fifty all told, and these are being tested out by the company that holds a monopoly for bus traffic in that city under the supervision of the Paris Municipal Council, to decide the type that

shall be adopted when the concession is renewed in 1911. There are only six single decked motor buses in London, and no more will be built because the maximum of sixteen passengers they can carry does not pay running expenses at the prevailing low fares, which average one cent per mile. All other motor buses in London carry thirtysix passengers, and every order being placed for new vehicles stipulates for the same capacity. There are some 450 motor buses, all double-decked, running about in the provincial towns of England and Scotland, about seven in Berlin, and 150 would more than cover the number for the rest of the European continent, inclusive of four in Constantinople.

#### THE SMALL CAR.

Now let us consider the matter of the small car, which the above quoted manufacturer considers neglected in Europe. Because a very large number of limousine and landaulet bodied vehicles were observed on the Continent, it does not follow that these were built there. During the 1000 touring season many hundreds of British built cars belonging to British owners have been shipped to France, and seeing these on the roads in that country, and the places principally resorted to by tourists. would give a stranger the impression that such vehicles were in demand where seen, unless the country of origin was known. In proof of this fact it is sufficient to mention that the international triptyques issued by the three motoring organizations in England who look after these matters are practically double those of the same period in 1908, and I shall not be wide of the mark in giving the figures as exceeding 2,500. The reason why so few small cars can be observed on the European Continent is not because there exists a demand that cannot be supplied, but because the general population cannot afford to purchase them or go to the expense of running them even if they were given away free of charge. The class from which the American manufacturer of medium and small priced cars derives the majority of his customers-professional men, large shopkeepers, farmers and the like-does not exist in Europe. If the motor factories in France had to rely upon business from that country many of them would have to close down, for it must not be forgotten that there are very few large land owners, most all the country being parcelled out into minutely small divisions, owned by the peasantry who till them; hundreds of thousands do not exceed 2 acres in extent. Shopkeepers and professional men who have to earn their living out of the peasantry must conduct affairs on a correspondingly small scale, hence it comes about that a French country doctor or attorney must be content with an income below that earned by a skilled workman in

the United States. Germany possesses larger manufacturing resources, consequently is able to spend more money upon motor cars than its neighbor, but the proportion of large to small cars sold there certainly does not exceed the ratio of I to 99. Switzerland can be dismissed as a negligible quantity for a car maker because of the absurd restrictions imposed by the various cantonal authorities. (This statement seems hardly correct when regarded in the light of the latest French export statistics.-Ep.) Even supposing the country rich enough to purchase cars freely, which is not the case, Belgium cannot absorb a fraction of the cars produced in its few factories, England being the chief market for an output that, all told, does not reach 1,500 chasses per annum. The few orders that ever come out of Holland are fiercely competed for by its neighbors. The majority of the Italian population are very, very poor, cannot purchase sufficient cars to keep their own factories employed, and those persons who can afford the initial outlay are handicapped by a heavy duty on gasoline, which costs 56 cents per gallon. Russia, vast as it is, can only take high priced cars, and these are more than supplied to the big land owners and manufacturers by France. Spain has one factory producing the Hispano-Suiza car, but so small is the demand, because of the notoriously bad roads, that attempts are being made, without success, to sell the machines in England. Portugal, Tnrkey, Norway, Sweden and the principalities in southeastern Europe must always remain, for geographical considerations, outside the car maker's programme.

#### THE ENGLISH MARKET.

England, with which can be included Wales, Scotland and Ireland, is a market that appeals very temptingly to American manufacturers, but I want to impress upon the American sales managers the serious difficulties encountered in attempting to find business in England. Eight years ago, before more than a handful of English factories existed, the Locomobile steamer and the Oldsmobile gasoline runabout sold in quantities, until purchasers discovered their faults, and thenceforward would have nothing to do with American cars in any shape or form. One car built in a Western State was handled here for eighteen months from a depot in the best district of London, was well advertised and pushed among the agents, yet only a few were sold. The most recent introduction favorably impressed me by its low prices and seemingly good features that would take the fancy of the British public, but when I went into details it was to discover with astonishment that, although there is a four cylinder engine and a selective type of sliding change gear, this last possesses only two forward speeds. And people here have been agitating for four forward speeds even on cars as small as 12 horse power. This same vehicle has so called "stream line" front mudguards, very small steps, and not a vestige of running board or accommodation for luggage for a tour, generator for acetylene lamps, or any place to carry a spare wheel. I could point out a dozen other things on this same vehicle that spoil it for the English market. I do not doubt for a moment that this car is soundly constructed, and more than worth the remarkably low price at which it is offered here.

NUMEROUS ENGLISH MAKES OF SMALL CARS.

A few months ago an illustrated article by the present writer appeared in these. pages, describing a few of the more prominent small cars sold in England. It is possible today to purchase four cylinder, 15 horse power cars from English factories. Many of these firms also build large cars, and while some few, such as the Daimler and Napier, have only recently fallen into line with the rest, there are plenty who achieved their first reputation with the small single cylinder or two cylinder machine, and have consistently devoted most attention to the development of this class. Rover, Swift, Riley, Star, Phoenix-a haphazard selection-are probably unknown names in America, but in England and the British colonies they sell in largely increasing numbers. These and many others were in use long before most existing American factories had been erected. They have been evolved by the genius of British designers, and for consistent reliability will stand the closest comparison with anything produced elsewhere.

## ECONOMICAL OPERATION REQUIRED.

To attempt to give a list of the French and German firms turning out perfectly designed and beautifully finished small cars not exceeding 15 horse power would mean a complete directory of the automobile trade in those two countries. Perhaps it may be news to American readers that the world famous German Daimler Company has built cars of that small power, and several are actually sold and being used by purchasers. The same thing is true in respect to every factory, and a man with \$1,250 to spend is not limited in his choice; on the points of speed, hill climbing, engine flexibility, comfort of passengers and reliability, it is really astonishing to count the number of good makes that are purchasable at the price just mentioned. Nor have the makers on this side fallen into the mistake that their American competitors have committed, by offering comparatively large horse power for little money. I do not know how the purchaser of this class of machine looks at things in America, but what is within my knowledge is the fact that east of the Atlantic the annual running expenses and upkeep must be reasonable. There is small consolation for a man who can climb a hill 5 miles per hour faster than his neighbor, who owns a machine of three-quarters the horse power that costs the same money, to find that the latter costs \$250 a year less for gasoline. Fuel consump-

tion contests have been an important portion of the programme of English automobile clubs for many years. I am not referring to the Royal A. C., but rather to the dozens of local organizations in every part of the kingdom that run off at least two, sometimes more, such contests each year. The trade have nothing to do with them, competitors using their own machines, which they take great pride in tuning up so as to obtain the last fraction of power out of every drop of fuel. The results of these competitions secure wide publicity, and thus it comes about that certain machines become branded with unenviable reputation as fuel wasters, irrespective of the sort of carburetor fitted.

FACTORY EQUIPMENT.

It has been alleged that British makers suffer for lack of modern machinery. I have been privileged to wander at will through every British automobile factory worthy of the name, and cannot recall a single place where machine tools of native origin do not largely predominate. American tools are found in every factory, but so also are German, and, to a very small extent, French tools, these last confined to small repetition work in brass. Not having to pay heavy import duties on raw material or manufactured goods, British makers are able to pick and choose their machine tools from every country; results, plus absence of repairs, are the factors which decide where orders for tools shall be placed. France is in a somewhat different position because most of the big factories were started on a very small scale nearly two decades ago and have grown gradually with the demand, consequently the tools employed seem, to a cursory onlooker, somewhat antiquated. But they are not so in reality, and the exquisitely finished chasses that come out of the good French factories constitute a sufficient answer to the supposed want of enterprise. Germany has little or no need to look outside its own borders for tools when one remembers that in one branch, viz., the generation of true epicycloidal teeth on bevel wheels, we Britishers unreservedly admit the German tool makers to be the leaders.

#### TREND OF TRADE.

The trend of trade in England during 1010 can be fairly summarized in a few sentences, because most of the important points have been brought out in the preceding paragraphs. Single cylinder machines of 8 horse power, selling for \$650, suitable for doctors' use, are not likely to continue their present popularity when plenty of two cylinder, to horse power cars can be had for another \$150. The four cylinder type, ranging from 12 horse power up to 16 horse power, will be the leading line with every maker. The two seated racing style of body, set right back above the rear axle, and an exaggerated rake for the steering column, for which there has been a craze this last year, is disap-

pearing, want of comfort and entire absence of luggage accommodation being the reasons for people asking to be supplied with something on more rational lines. Where only two seats are fitted, these will be situated nearly midway between the front and rear axles and the steering column brought up proportionately to a smaller angle with the floor boards. The five seated side entrance body is still the most popular

and is not likely to be altered, but an addition will be made in the form of doors to the front seats, as high as the dashboard. On mechanical details it is impossible to give the slightest forecast at the time of writing, for the good and sufficient reason that the doors of every factory are jealously guarded against the intrusion of strangers while the new models for the Olympia Show in November are being pushed ahead.

# Shock Absorbers.

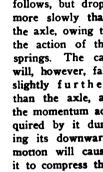
By FREDERIC STRICKLAND.

The action of the so called shock absorbers is not well understood by many motorists. In practice their principal object is not to absorb shocks, but to prevent the recoil from the springs. The object of the springs which carry a car is to prevent the body of the car from following the inequalities of the road. Without springs the car would naturally almost exactly follow the contour of the road, and as the road surface is far from smooth the result would be great discomfort to the passengers. If we could

length as carriage springs. There is a limit, however, to the length of springs practicable in a car, as if they are too easy the car sways unpleasantly, and it is quite possible for this motion to be so bad as to make the passengers seasick. In practice one of the great difficulties

of comfortable springing is to avoid an unpleasant recoil from the springs when the latter are compressed by a bump in the road. This action will be seen from Fig. 1. As the car comes to a hollow in the road the axle drops into it. The car

> follows, but drops more slowly than the axle, owing to the action of the springs. The car will, however, fall slightly further than the axle, as the momentum acquired by it during its downward motion will cause it to compress the spring beyond its

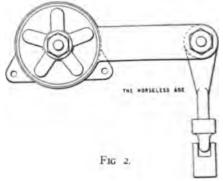


If at this moment the road normal. resumes its normal level the spring will be still more compressed, and on the axle getting to the normal level a great part of the power spent in compressing the spring will be given out again, and the car will be lifted a good way above its normal level. The action will be somewhat as shown in the figure. No spring gives out the whole of the power put into it, owing to the internal friction of the spring itself, but most springs give back so much that a very unpleasant motion is caused to the car. This is most unpleasant when it happens to the back wheels, especially if the front wheels happen to pitch into a hole at the same time that the back of the car goes up. The result then is that the back of the seat hits one in the back. The shorter the wheel base the worse this action is.

A shock absorber consists of a device for increasing the friction of the spring, so as the prevent its lifting the car to the extent it otherwise would do. The majority of designs consist of some sort of friction brake attached to the axle by a lever, a simple form being shown in Fig. 2. It is obvious that such a device can be made to entirely prevent the recoil of the spring

if the friction in it is great enough, but that any action it has in this way also has the effect of reducing the motion of the spring all round. Thus if the friction was made great enough the effect would be to prevent any motion of the springs whatever, and the result would be the same as if there were no springs. The adjustments of such devices must, therefore, be a matter of trial and error, in order to get the best result. If the friction is too great there will be not enough give in the springs, while if it is too little there will be too much recoil. In order to get over this difficulty, some shock absorbers have been made with a ratchet arrangement so that they do not interfere with the car moving toward the axle, but introduce a good deal of friction when it moves away from it. This is probably an improvement. In some cases the device is so arranged that there is no friction at mid-position, and for a little way on each side, but it increases rapidly as the body departs from this.

It may be observed that the whole question of shock absorbers is dependent on the amount of internal friction of the springs themselves. It is obvious from what has been said that the effect of the shock absorber is principally to increase the internal friction, and that if springs could be made with enough internal friction, no shock absorbers would be required. The internal friction of springs varies enormously according to their design and material. Spiral springs, for instance, have very little, and hence are seldom employed alone for vehicles of any kind, as they have a great tendency to oscillate. The friction of plate springs depends on the number of leaves and their material. As the spring gives, the leaves have to slide over each other and thus develop friction. Springs of equal strength may be made with a few thick leaves or many thin ones, but the latter will have much more friction than the former. Springs of equal width and thick-



ness of leaves may also be made either of steel tempered as hard as it can be made without breaking, or they may be as soft as possible without permanently deflecting. In the latter case about twice as many leaves will be required as in the former. other things being equal. The friction between the leaves will therefore be much greater. In addition to this, the soft leaves have a great deal more friction in the steel

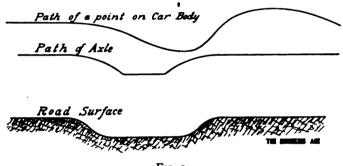


Fig. 1.

have a car perfectly sprung, however, the car itself would travel in a level line while the axle would follow the inequalities of the road, being kept in contact with it by the springs. Such a result is, of course, quite impossible, because it would require springs of infinite length. In practice the springs must have considerable stiffness in order to give the car sufficient stability, and all one can do is to so arrange them that the movement of the springs due to the inequalities of the road are converted into long, easy motions, which do not cause any discomfort to the passengers. The length and stiffness of the springs necessary for any particular purpose can only be settled by experiment and are different for different types of road, different bodies, etc.

Carriage builders found out many years ago that for comfort springs of good length were necessary; but the early European motor cars were entirely governed by racing, in which the whole object is to cut down weight at the expense of comfort, and therefore the shortest springs are used which will avoid breakage of the machinery. Since racing ceased to have so much influence on car design springs have been greatly lengthened. till they now are about the same

# THE HORSELESS AGE

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FRED J. WAGNER, CHARLES B. AMES.

# The Commercial Aspect of Road Races.

It is perhaps only natural that with the multiplication of road races this year there should come complaints about poor financial returns. Our readers will remember the reports of a deficit of about \$30,000 in connection with the Crown Point-Lowell race. The Long Island Motor Derby, held in the vicinity of New York during Hudson-Fulton week, which was evidently organized in the hope of attracting some of the hundreds of thousands of country visitors then in the city, is said to have proven an unremunerative enterprise from the standpoint of the promoter, who is quoted to the effect that he is through with the organization of road races. Even the Lowell, Mass., carnival, which was heralded as a great success in every other respect, appears from an interview published in a Lowell paper to have resulted in a financial loss.

The reports of the tremendous attendance at the last several Vanderbilt Cup races, no doubt, gave the incentive to the organization of road races that are being held all over the country. The word has been passed that the general public is becoming interested, and that much greater crowds can be reckoned upon than in former years. But with the increase in numbers has come a decline in quality, and the amount of money spent per capita is much less than it was in former years, when only "automobile enthusiasts" attended races. At the same time the expenses of organization have increased, owing to the precautions for the safety of the public and the drivers insisted upon by the A. A. A. and the manufacturers. The expense of organization, including the necessary outlays for procuring permits and securing entries, together with the sanction fee, the cost of oiling and guarding the roads and that of erecting the grand stand, make a properly organized road race quite an expensive affair. A study of the above items of expense may also shed some light on the reasons which led the Cups Holding Association to shorten the Vanderbilt Cup course this year from 20 to 12 miles, in round figures.

On the other hand, nobody can be compelled to pay for the privilege of seeing a race held on public roads. The returns from such a race are limited to the entry fees, the proceeds from the sales of grand stand seats and the amounts obtained from the sale of programs, from program advertisements and from various small concessions. In France, where suitable courses are found in abundance, the race promoters exact very large bonuses from the localities in which the races are held, but in this country, where closed circuits of improved roads near large cities are relatively few in number, there is no such keen rivalry between different sections as to prompt them to offer large bonuses to the race promoters.

Whether or not a race proves profitable depends primarily on two things, viz., the amount of advertising it receives in the press and the judgment of the men in charge. If a race is widely heralded in the press it is sure to be largely attended, but a large attendance is alone no guarantee of financial success. If the promoters demand extortionate prices for seats, or are too optimistic in making estimates of the grand stand accommodations required, the venture is likely to prove a failure.

# Automobiles and the Hudson-Fulton Celebration.

It must have occurred to many of those connected with the automobile industry and trade who witnessed the Hudson-Fulton celebration in New York last week that the automobile played a rather inconspicuous part in this celebration. The events of the week were naturally largely of a marine character, as befitted a commemorative event in honor of an explorer's voyage and of the invention of steam navigation. But in addition to the naval parades, motor boat races, regattas, etc., there were a considerable number of festivities on shore, and had the event occurred ten years earlier there is very little doubt that an automobile parade would have been included in the program. However, the time when the automobile was an object of public curiosity has passed, and there is no reason why it should be regretted. The motor vehicle is no longer in its infancy, but has assumed its proper place in our everyday life. Indirectly the automobile had a great deal to do with the celebration, and the officials and employees of our taxicab companies especially will probably long remember the demands made upon their services during the event. Many of the visitors to the metropolis during the past week will carry home with them impressions of the convenience and comfort of the motor cab, and few will return home without having been impressed with the large part the automobile now plays in the traffic of our big cities, and with the importance of the automobile trade, which occupies block after block of New York's main commercial avenue.

#### Cold Weather Warning.

In a few weeks sharp night frosts may be expected in the northern section of the United States, and those who drive or care for water cooled cars are herewith warned to take the proper precautions to prevent injury to their cars from freezing of the cooling water. Most cars will be kept in use for at least two months longer before they are definitely stored away for the winter, and it is during the months of October and November that most freezing accidents happen, chiefly because cold snaps then often come unexpectedly. During this period each year many cylinders are cracked, owing to the carelessness of those whose duty it is to look after the cars. This always involves an expensive repair or replacement, and the replacements are the more onerous now that twin cylinder and quadruple cylinder castings have largely replaced single cylinder castings.

As early in the season as there is any likelihood of sharp night frosts in the particular locality, either the regular cooling medium should be replaced by some fluid with a low freezing point, or else, if it is intended to use the car only a few times before putting it away for the winter, the cooling system should be thoroughly drained before turning the car in when returning from a trip. The most commonly used non-freezing cooling fluid is probably a solution of wood alcohol. A solution made up of one part of wood alcohol to two of water freezes at about minus 12 degrees Fahrenheit. Some use a solution comprising one part of wood alcohol, one part of glycerine and four parts of water, which freezes at about minus 15 degrees Fahrenheit. Calcium chloride solution is also used. Three and one-half pounds of the hydrated chloride to one gallon of water gives a solution which freezes at minus 8 degrees Fahrenheit. When the latter solution is used care must be taken to remove any acidity present by adding lime until the solution turns red litmus paper blue, otherwise it will attack the metals of which the parts of the cooling system are composed. Later on, if the temperature happens to be much below the freezing point, it is a good practice when leaving a car at the curb for a considerable length of time to throw a robe over the radiator so as to keep the heat in. On cars with a very energetic cooling system it is often advantageous to remove the fan drive during the winter, which will cause the motor to operate at a high cylinder wall temperature, and thus more efficiently.

### Soft Edged Seat Cushions.

Increasing the wheel base, improvements in springs and the adoption of larger wheels and tires have rendered the modern automobile conveyance of the utmost luxury. Attention has also been paid to the upholstery and very thick spring cushions have taken the place of the thinner hair filled cushions, with very few or no springs, which characterized the earlier motor cars. It is now so common for automobiles to be used for continuous all day drives, covering hundreds of miles, that the most extreme care must be taken to secure comfortable seats, in order that the fatigue and stiffness which are likely to arise from the protracted continuance of a nearly fixed position may be reduced as much as possible.

This consideration has led to the bringing out of the soft edged cushion which characterizes many of the 1910 models of high grade cars, and bids fair to come into general use. With the ordinary type of spring cushion, while the weight of the body as a whole is comfortably supported, there is a certain tendency toward fatigue and chafing at the points where the limbs rest upon the front edge, which is of an unyielding nature, as the frame of the cushion is a continuous edging of wood bent or sawed to conform to the required outline.

In the soft edge cushion the wooden frame is omitted along the front edge, the flexible leather covering only being used there, and the springs being held in place by sheet steel pieces running from side to side of the wooden frame. The edge thus conforms perfectly to the contour of the part of the body which rests upon it and a much easier seat is thus obtained, the front leather and the springs back of it giving in the required degree.

Details such as these, though minute in a way, are of immense importance in helping to make the motor car what it should be—the most comfortable highway conveyance.

#### The Demand for Machine Tools.

Probably the need for additional machine tools has never been more acute in the automobile business than it is at the present time. With a large number of new companies entering the field, and most of the established companies building additions, tools of all kinds are needed to turn out the required number of parts.

The trend of manufacture is indicated by the increasing orders for automatic machinery and the frequent newspaper ads for competent screw machine men. A considerable number of special machines are being brought out. Most of these are designed to reduce the amount of handling necessary to finish a piece. Every effort is made to bring as many tools as possible to work upon the piece at a single setting. This accomplishes two objects: It reduces the time of handling and the liability to mistakes.

As a result of this increased demand, which is especially great along certain lines, the time required for the delivery of machine tools is increasing. As is usual in such cases, a few wideawake manufacturers of machinery are getting a large share of the business, but the present demand is large enough to enable many more to profit by it. Those makers of machines who have not already studied the requirements of atuomobile manufacturers would be well

advised if they were to investigate the situation.

#### French Auto Taxation.

The automobile tax laws passed by some of our State legislatures last winter stirred up considerable opposition, it being claimed that the imposition of a special tax on automobiles, in addition to the personal property tax collected on them in many localities, constitutes double taxation. However, when the amounts involved are considered and compared with what auto owners in some foreign countries are compelled to pay American motorists may consider themselves fortunate. Double taxation may be unconstitutional in this country, but in France the National Government levies a tax against the motorist first on the number of seats on his car and then on the number of horse power developed by its motor, and when the National Government gets through with the motorist taxpayer the municipal authorities take him in hand and tax him according to the same schedule.

Not satisfied with taxing the car, the French Government also collects a heavy duty (7.5 cents per gallon) on gasoline, and the municipal authorities of Paris collect an octroi duty on gasoline entering the city amounting to twice the Government tax. The sums which thus flow into the national and municipal treasuries out of the pockets of motorists in the course of a year are almost staggering. The whole subject is receiving a thorough airing at the present time, owing to the attempt of the French Minister of Finance to still further increase the schedule of taxation. One of our French contemporaries publishes a table of the direct and indirect taxes borne by the owner of a 30 horse power car in Paris, on the assumption that he burns about 1,000 gallons of gasoline a year. In that case the state and municipal taxes on the car and the taxes on the fuel amount together to \$325. It is quite conceivable that many people in that city are deterred from purchasing automobiles by these high taxes. More than half of the amount consists of the indirect taxes on the fuel, and motorists in this country may consider themselves fortunate that very extensive sources of gasoline are found within the country, and that they have tax free fuel

The A. C. of Switzerland, which has its headquarters in Geneva, will hold an automobile show in May, 1910, combined with a show of aeronautic apparatus.

## The Taxicab Business in Paris.

By P. MAISONNEUVE.

In Paris there are at present 3,312 motor cabs in public service, of which 282 are the property of their drivers, while the rest belong to operating companies, the principal ones among which are the following:

Compagnie Camille.

Compagnie des Auto-Fiacres.

Compagnie des Automobiles Météor.

Compagnie Génèrale des Fiacres à

Compagnie Parisienne des Voitures de Place Automobiles Francia.

L'Urbaine.

Bondis & Cie.

Compagnie des Auto-Taxis De Dion-Bouton.

Compagnie des Automobiles Ours.

The Ours taxicabs are operated by the manufacturing company of that name, and the De Dion-Bouton cabs are operated by a subsidiary company of the large De Dion manufacturing firm. The other companies are entirely independent, and certain among them, such as the Compagnie Camille, the Compagnie Générale des Voitures à Paris and L'Urbaine are horse cab operating companies, which in recent years have supplanted some of their horse equipment with motor propelled cabs and are now operating both horse and motor cabs.

The principal makes of chassis represented by the 3,312 taxicabs in actual operation are the following:

Renault two cylinder, 7-10 horse power.

Unic (Georges Richard) two cylinder, 8-10 horse power, and four cylinder monobloc, 10-12 horse power, with two bearing crank shafts.

Bayard-Clement four cylinder, 12-16 horse power, and (recently) single cylinder, 8-10 horse power, which are very short and have the control at the left.

Delahaye two cylinder, 10-12 horse power, and four cylinder, 10-14 horse power. De Dion-Bouton single cylinder, 8-10

horse power.

Ours, three cylinder vertical, 14-16 horse

Krieger-Brasier, four cylinder, 15 horse power, with electric transmission to the front wheels.

Charron, two cylinder, 8-10 horse power.

In addition to the above, a few cabs of many different makes are met with on the streets of Paris, but the majority of them belong to the drivers themselves.

In accordance with the regulations to which all other motor vehicles are subjected, taxicabs must be capable of turning in a circle of 7 metres (20 feet) radius. The drivers are submitted to a special examination, known as the "coachman's examination," which bears mainly on the geography of Paris. They, of course, must have the regular driver's permit required of every automobile driver.

The bodies employed are all of the so called landaulet type, that is to say, with a folding rear portion, giving at will an open or closed vehicle. The driver is protected by a small hood which can be extended when it rains. Those cabs which have the control members at the left have a place at the side of the driver where trunks or other baggage may be carried, for which an extra charge is made, The rates of fare are not uniform. They always comprise an initial charge of 0.75 franc (15 cents), and this entitles the patron to a ride of 1,200, 900 or 600 metres (three-quarters, nine-sixteenths or three-eighths of a mile), according to the type of vehicle and the number of passengers carried. The tariff No. 2 is applied when more than two passengers are carried. The next charge to be registered by the instrument is 10 centimes (2 cents), and entitles the patron to a ride of 400 metres, 300 metres or 200 metres (one-quarter, three-sixteenths or one-eighth of a mile), or fraction thereof, according to the tariff of the vehicle. The charge for waiting four and onehalf minutes is the same as that for driving I kilometre (five-eighths of a mile). If the fare wants to go outside the fortifications of Paris he is obliged to pay 50 centimes (10 cents) extra, and if he discharges the cab outside of Paris he is obliged to pay an extra charge for the return trip, which is calculated by the aid of a map issued by the police department of Paris.

After having thus outlined the general conditions of operation, let us look a little closer into the question of the receipts necessary in order to make the services pay. The operating costs are made up of the following items:

1. General expenses, including rent of offices and garage, salary of officials, etc.

2. Amortization of the rolling stock.

3. Repair of rolling stock.

4. Wages of drivers, cost of fuel and oil. This latter item is proportional to the receipts.

The receipts consist solely of the payments for trips made by customers of the company, and this varies between 30 and 60 centimes per kilometre. The outlay for fuel and oil is proportional to the daily mileage, and amounts to 8 to 10 centimes per kilometre covered. The driver who is made this allowance is thus free to use either gasoline or any other fuel he may desire. As gasoline sells in Paris at present at 57 centimes per litre (42 cents per gallon) the majority of the taxicab drivers use a fuel with a benzol base, that is to say, hydrocarbons derived from coal tar, the price of which in Paris ranges between 35 and 40 centimes per litre (about 30 cents per gallon). This fuel, which is also used for the motor buses operated in Paris, does not give very good results on vehicles which are not specially adapted for it. The majority of the

Parisian taxicabs give off a disagreeable odor and smoke, notwithstanding the fact that this is forbidden and punished by fines in Paris.

The tips paid to the drivers are theirs, in addition to the commission paid them, which varies between 15 per cent. and 35 per cent. of the total receipts, according to the amount of the latter. Notwithstanding the large number of motor cabs in service at present, the drivers earn an average of from 10 to 15 francs (\$2 to \$3) per day.

It is to the advantage of the drivers to see that their vehicles are not out of commission, for each day the car spends in the repair shop is a period of idleness for the driver, except under specially favorable conditions, when there is a "free" car at the garage, or one of the drivers is absent, due to sickness or some other cause. The cars leave the garage in accordance with the public demand for transportation facilities, at three periods of the day, as follows: In the morning from 9 to 10 o'clock; in the evening at 6 o'clock, and (a few vehicles) at 9 o'clock. The first vehicles return to the garage between 7 and 9 o'clock in the evening, and the others between midnight and 2 o'clock in the morning. The latter are used for the night service.

The cab stands do not belong to private companies, but to the Paris city administration. There are 301 such stands in the city, which are under the direct control of the chief of police. At each of these stands there is a "complaint book," in which patrons may jot down any complaints they have to make. If any of these complaints are found to be justified the drivers concerned are punished by periods of suspension or by fines.

Vehicles which are not fitted with taximeters are rented by the day, the week or the month, but the rent for a 14 to 20 horse power landaulet is 1,000 to 1,500 francs per month. These vehicles carry no other visible inscription than a red stamp of the police department on the number plates. The taxicabs, on the other hand, must carry numbers on their lamps and have colored glasses, each of the different stations having a special color.

A number of the operating companies which are affiliated with manufacturing companies do their own repair work. The majority of these conduct a repair shop in which to make their minor repairs and have a contract with the manufacturer for furnishing renewal parts. Some of the companies figure on a three year amortization, and others on a five year amortization, but the vehicle bodies need renewal long before that time. From an inquiry made by the writer it results that the relative frequency of mechanical troubles with the different parts is as shown by the following table.

No mention is made in the table of the motor, which rarely gives trouble. It occasionally happens that

balls in the crank shaft bearings break. With built up crank shafts the parts will sometimes come loose. This trouble is peculiar to one make of cab.

	r Cent
Change gear	40
Differential gear and propeller shaft	20
Ignition	10
Axles, spindles and wheels	20
Steering gear	5
Clutches, etc	

The cost of pneumatic tires, whether they are furnished by the manufacturers under contract or whether they are purchased by the operating companies under a special agreement, is about 10 centimes per vehicle kilometre (3.2 cents per vehicle mile), based on the total running distance and not on the paid mileage.

A somewhat similar service to the taxicab service is conducted in connection with some of the railway depots in Paris, either by the railroad companies themselves or by companies having a concession from these companies. Two of the companies having depots in Paris. viz., the Paris - Lyon - Mediterranée Railroad Company and the Orleans Railroad Company, operate these services themselves. They employ LaBuire chassis, the same make which is employed in the postal service. These vehicles serve for carrying travelers from their homes to the railroad station, and vice versa.

The fare varies according to the number of seats of the vehicles, but is not less than 5 francs (\$1).

Much more important than improvement in the mechanism of the motor cabs is a better training of the drivers. The majority of the drivers drive much too fast and recklessly, at the risk of damaging their machines by abrupt braking and sudden gear changing, and causing frequent accidents.

#### Another Rise in Tire Prices.

The unprecedented rise in the market price of crude rubber has forced a second general increase in automobile tire prices within eighty days and calls attention to the increased demand for rubber gum which has followed the expansion of the automobile industry.

"The tire output of this year will total nearly \$30.000,000," states H. S. Firestone, "and next year's production is expected to run between \$45,000,000 and \$50,000,000."

"The rubber harvest has shown an average annual increase of only about 11 per cent. for several years, which is barely enough under normal conditions to keep pace with general business requirements. It is owing principally to the recent large demand and to local conditions in the rubber districts that fine Para rubber has steadily risen from 67 cents a pound in February, 1008, to the record price of \$2.15 which now prevails for immediate delivery. There is very little to be had even at that price."

# Automobiles and Sanitation.

By Albert L. Clough.

Public opinion and sanitary authorities are now fully awakened upon the subject of the part played by the common house fly in disseminating disease, and it is interesting to note that there is an important connection between this subject and the automobile.

The house fly deposits its eggs in decaying refuse of various kinds, but the natural place of deposition is in the dung of animals. Horse manure is the usual medium chosen. The fly larvæ, emerging from the eggs, feed upon this decaying matter, and finally emerge as fully formed flies. Unless horse manure or some equivalent form of offal is present in a certain locality no flies can be bred there, as no food for the fly larvæ is at hand.

In cities and towns, in recent years, garbage and animal wastes have generally been carefully disposed of, with the exception of the collections of manure in stables. Swill is promptly collected, the keeping of swine, hens and cows has been largely abolished; but the public and private horse stable has been and is still allowed in most urban districts, as being a necessity.

Under these conditions the stable has furnished the main breeding place for house flies, and a very prolific one, notwithstanding municipal regulations enforcing the frequent cleaning out of barn cellars and the like.

Within the last few years, however, a decided change has been wrought by the introduction of the automobile in certain parts of most cities and towns. A good many public stables have been converted into public garages or discontinued altogether, and a very large number of private horse stables are now used to house motor cars instead of horses, or contain fewer horses. In instances where both horses and cars are kept in the same building greater cleanliness is generally observed in consideration for the finish of the cars there stored. In many towns and small cities where the automobile has made extensive progress a great many private stables have been built over into small tenements for renting purposes.

Another cause which has tended to the diminution of the number of stables has been the disinclination upon the part of timid people to drive horses in good automobile districts. Innumerable driving horses have been given up on this account by ladies. Furthermore, trolley lines are continually being extended, and a large class who formerly used horses now use the electrics.

Upon a number of occasions within the last year or two the writer has heard comment made upon the relative scarcity of flies in certain residence districts, and in each instance it has been found, upon investigation, that many of the stables

in the near vicinity had recently been transformed into private garages or given up.

Fearing to conclude too hastily that there was any connection between this fact and the observed scarcity of flies, an expert entomologist was consulted, who gave the opinion that the causal connection was a valid one. It appears that house flies do not, as a rule, move very far, in their short lives, from their breeding places, unless under the action of winds, and thus it is possible to study separately a particular district.

Apart from the matter of stables is that of street dirt as affected by the automobile. Unpaved streets are seldom swept and the horse droppings thereon are breeding places for flies. When the automobile traffic over such a street has displaced, in a large degree, the horse drawn traffic, the condition of the street as a "fly nursery" becomes much less favorable.

It may now be taken as a fact that the introduction of the automobile has progressed far enough to make a sensible difference in the number of these disease bearing and annoying insects which are bred in certain residence localities of our cities and towns. An entomological friend says that if the good work continues and eventuates we shall have no flies, and he is even inclined to extend the decimation to the English sparrow.

The automobile is blamed for all kinds of evil. When a good word can be said of it, let it be shouted from the house-tops!

# Studebaker Branch Managers' Convention.

Twenty-four branch managers of the Studebaker Automobile Company attended the annual convention at South Bend, Ind., last week. Among the incidents of the week was a tour of inspection in electric cars through the large carriage and wagon factory of the company in South Bend. From South Bend the party of branch managers, accompanied by officials of the company, made a trip to Detroit in a special car, and from there they went on to Elyria, Ohio, at which latter two places they inspected the different factories in which the various Studebaker gasoline cars are manufactured.

# Sibley Motor Car Company Organized in Detroit.

The Sibley Motor Car Company has been organized and incorporated under Michigan laws to manufacture a popular priced touring car and roadster. Plans are being developed for a quantity production next year. The incorporators are Frederick M. Sibley, Henry Wineman, Jr., John G. Utz and John B. Phillipps. Mr. Utz and Mr. Phillipps were formerly associated with the Chalmers-Detroit Motor Company as chief engineer and superintendent, respectively.

# **NEW VEHICLES AND PARTS**

### Rambler 1910 Models.

The Rambler line for 1910 will comprise five models built on three different chassis. All are four cylinder machines equipped with magnetos and 36 inch wheels. The new models and the prices are as follows:

Model 53, five passenger touring car, \$1,800.

Model 54, five passenger touring car, \$2,250.

Model 54, four passenger close coupled car, \$2,250.

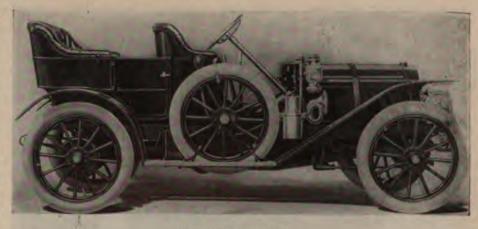
\$2,250.

Model 55, seven passenger touring car, \$2,500.

Model 55, seven passenger limousine, \$3,750.

The design and material of the engine, transmission, drive shaft, axles, frame and wheels are the same for all three chassis, and the differences relate to size only. The distinguishing features of Rambler design during the past several years, such as offset crank shaft, large wheels, straight line drive, Rambler spare wheel and engine accessibility, have been retained in the new models. Two of the chassis have 5x5½ inch engines, rated at 45 horse power, and the chassis differ only in the length of wheel base and the size of tires.

Model 55, the seven passenger touring car, has a 45 horse power engine, a wheel base of 122 inches, 36 inch wheels and 41/2 inch tires. The equipment of this model includes a magneto, gas lamps, a Prest-O-Lite tank, electric side and tail lamps, and a 6 volt, 80 ampere hour storage battery. The same chassis with 5 inch tires is used for the seven passenger limousine. Model 54 is provided as a five passenger touring car or a four passenger close coupled car, and the same equipment is furnished with it as with Model 55. It is fitted with a 45 horse power engine, and has a wheel base of 117 inches and 36x4 inch wheels. Model 53 is another five passenger touring car, and is almost a duplicate of last year's Model 44. It has a 41/2x41/2 engine rated at 34 horse power, and the equipment includes magneto and lamps. The following



RAMBLER FIFTY-THREE.

description applies to both Models 55 and 54.

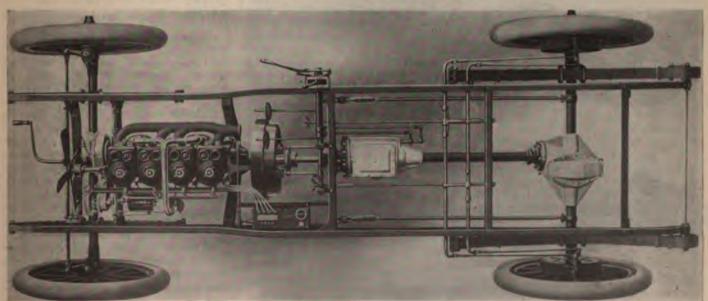
The engine, as the photograph shows, is of the same type as used in Models 44 and 34 Ramblers of the past two seasons. The valves overhang all on one sides and the crank shaft is offset 25 per cent. of the piston stroke. The crank case is of the barrel type with an opening 23x8 inches on the side for inspection and adjustment. A wedge type of bearing adjustable from the side, shown in the illustration, makes possible easier and more perfect adjustment from the side than can be accomplished by the bolt method. In the 1910 model the pump has been moved to a position forward of the cam gear case. This change is to provide for a more accessible magneto location. It is now located on an extension of the pump shaft just back of the cam gears. It can be very easily reached for both inspection and adjustment. A combined shield and oil gutter attached to the crank case at the rear of the flywheel and main bearing returns all surplus oil that may work through this bearing back to the crank case. This eliminates the possibility of its dropping on to the flywheel.

and being thrown on to the other mechan-

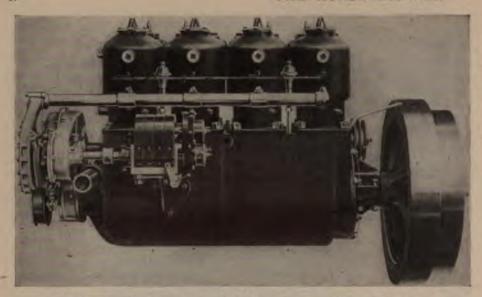
In Models 55 and 54 chassis the clutch has been changed from the cone type to the internal expanding type. This eliminates end thrust on the crank shaft, and its design is such that it exerts the greatest pressure when fully engaged. With the average clutch the spring is expanded when the clutch is engaged so that it then exerts the least instead of maximum pressure. This clutch has been very thoroughly tested on a number of different Ramblers, and it has been found to be ideal in operation. It is said to engage very gradually, hold positively, and disengage instantly.

The only change in the transmission is at the roller bearing, which carries the forward end of the main drive shaft. This is a hinged bearing with a dowel fastening, retained in a steel case, and provided with adequate means to compensate for all end thrust.

The rear axle continues of the semifloating type, but the drive shafts are larger, and a new method is used for securing the wheels. On the Rambler drive shafts the differential gear is upset on the end of the



RAMBLER FIFTY-FOUR CHASSIS.



RAMBLER FIFTY-FIVE AND FIFTY-FOUR ENGINE, MAGNETO SIDE.

shaft, making the drive gear and axle integral. Now, the wheel end of the shaft is also upset. This enlarged end is squared and tapered for the forged wheel hub. This method of upsetting or enlarging the shaft before squaring it makes it strongest at this point, whereas otherwise the metal removed by squaring would weaken it.

The springs are of the triple action type, but somewhat modified in design from those of last year. They are straighter, and the second leaf is longer, extending into the bend of the top leaf so as to support it.

The steering continues of the screw and nut type, but the nut has been lengthened to increase the wearing surface, and a ball thrust bearing has been added with better provision for adjustment.

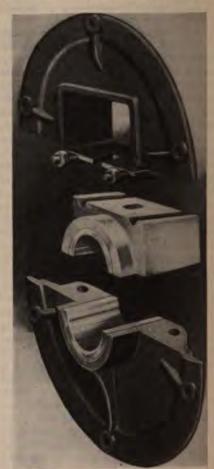
A neat pressed steel bracket supports the bonnet at the dash. The strap is done away with, and the bonnet is held down by convenient spring clamps. Particular attention has been paid to the guards; they are wider, heavier, better braced, convexed both to strengthen them and improve the appearance, and their outline is much more graceful. The front guard follows the radius of the wheel, while the rear guard extends straight back with the body lines. A neat filler strip projects from nearly the top of the frame to the running board, entirely covering the running board supports. Four of these supports are provided for the larger and wider running board now used. This board is aluminum covered.

The changes in the bodies apply alike to



THE NEW RAMBLER FIFTY-FIVE, FIFTY-FOUR, AND FIFTY-THREE REAR AXLE SHAFT, ROLLER BEARING, SLEEVE AND CASE AND END OF AXLE TUBE.

both models. The most important change is a lower position of the seats. This adds to the comfort of the passengers, and improves the appearance. More room is provided between the front seat and the pedals. The tonneau floor is countersunk between the frame channels, providing plenty of room even with the lowered seat. Above the frame channels the tonneau is widened. In the seven passenger job ample room is provided to pass between the two extra chairs when they are occupied. These



FIFTY-FIVE ENGINE BEARING, WIDE TYPE AND ADJUSTMENT.

bodies are very richly upholstered with hand buffed leather, curled hair and deep springs. Deeper springs and more and better hair are used than heretofore, adding greatly to the riding qualities.

Although Model 53 is a smaller car, it can hardly be called a small car, particularly in power. With 41/2x41/2 cylinders the engine delivers 34 actual horse power by dynamometer test. The wheel base is 108 inches, the wheels are 36 inches, and the tires are 31/2 inches. Four inch rear tires are furnished, if desired, at \$20 extra. The description of Models 55 and 54, relating to the pump and magneto locations, the oil shield and gutter, transmission bearing and rear axle, applies also to this model. Practically the only other important change from its predecessor is in the rear springs. They are the full elliptic Rambler type, with involute ends. These springs have been used for two seasons on other Rambler models.

### National 1910 Models.

Three models will be manufactured by the National Motor Vehicle Company, of Indianapolis, for 1910. In addition to the former models a new four cylinder, 40 horse power, five passenger car will be produced to sell at \$2,500. The several models will be known as the "National 60," which is a six cylinder car with 5 inch bore and 5 inch stroke motor; the "National 50," with six cylinder, 4½ inch bore and 4¾ inch stroke motor, and the new "National 40" four cylinder car. Since the new "40" embodies all the improvements which have been made in the older models, only it will be dealt with here.

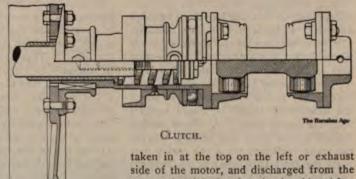
The cylinders are cast in pairs, and are of 5 inch bore and 516 inch stroke. They are not cast with a common cylinder wall in the centre as some twin cylinders are cast, but the cylinders are entirely separated, leaving a water space at the top and an air space between them at the bottom. In machining the cylinder castings they are first bored to within 25-1000 inch of the finished size, and are then placed in an annealing furnace, in which the temperature is gradually raised to 1,000° Fahr., and which is then allowed to gradually cool, the process occupying twenty-four hours. They are then returned to the inspector, who tests them under cold water pressure, and if found in perfect condition they are sent to the machine room, where the valves are seated and the valve stem guides put in place. They are then ready for the cylinder grinder.

While the cylinder walls are being ground the cylinders are kept at an even temperature by means of hot water, and the dust is removed by air pressure from a blower. The cylinder is then again inspected, and the valve chamber caps are fitted. These valve chamber caps are in two pieces, and do not seat upon gaskets. The

lower portion of the valve chamber cap, the one into which the spark plugs are fitted, has a taper seat which conforms to a similar seat in the cylinder casting. These seats are of 45 degree angle, and are ground together in the same way the valve seats are ground in. This lower portion is held in place by a threaded ring similar to the thread on an ordinary valve chamber cap.

The nickel steel valves are of 2% inches diameter, with 3% inch lift, and 15-32 inch stems, with hardened ends to reduce wear from the action of the valve lifters. The lower ends of the stems are slotted to receive a flat key for holding the valve spring retaining cup. This retaining cup is turned with a shoulder which fits inside the valve springs, holding it in position.

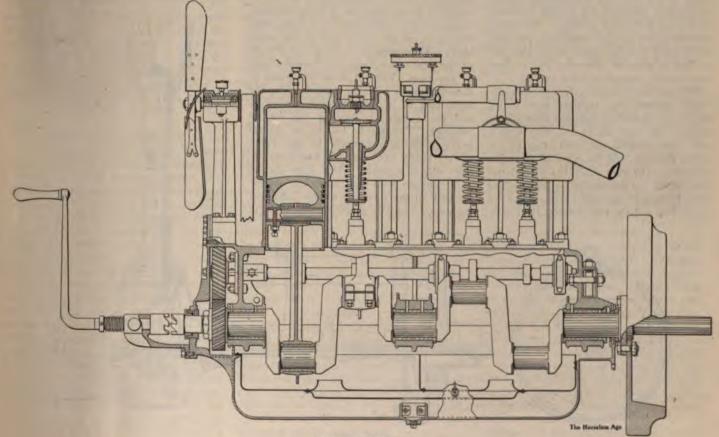
The water jackets are large, covering the whole cylinder head. The cooling water is



taken in at the top on the left or exhaust side of the motor, and discharged from the top on the right hand or intake side. After the motor has been completely assembled it is placed on a stand, the cylinders are filled with clear oil, and the engine is run by belt for several hours to lap and polish the pistons, piston rings and cylinder walls.

The pistons are long and subjected to the same annealing process as the cylinders. They have four compression rings at the top, and two oil grooves at the bottom. These grooves are 1-64 inch deep and ½ inch wide. The pistons are slightly oval and highly polished, to prevent the sticking of carbon as much as possible All pistons are machined to within an ounce of a standard weight, as are all reciprocating parts. The piston pin is a hollow, nickel steel pin, hardened and ground, and held in place by a set screw and lock nut. The hole in the pin is large, and the set screw seats in a spot hole on the top side of the pin.

The crank shaft is a solid one piece drop



NATIONAL MOTOR.

forging of 40 point carbon steel, hardened and ground to size. It has three bearings lined with white bronze die cast bushings. The main bearings of the crank shaft are all 21/2 inches in diameter, the rear bearing next to the flywheel being 45% inches long, the centre bearing 334 inches, and the front bearing 31/4 inches. The flange to which the flywheel is bolted is forged integral with the crank shaft. A thrust washer bearing on the front end bearing between the crank shaft and the crank casing prevents the shaft from wearing the bearings endwise from clutch spring pressure. The crank shaft gear is fitted to a taper bearing with a Woodruff key, and held in position by a lock nut. The crank shaft gear and cam shaft gears are of the helical type.

The connecting rods are I section drop forgings, and of the same material as the crank shafts. A cup is milled into the top of the connecting rod to catch oil splashed into the top of the piston. This helps supply the piston pin with lubricant. The top bushing is of phosphor bronze, 25% inches long. The lower bushing is of white bronze of 118 inches in diameter and 3 inches long. The lower bearings are of the marine type, the cap being held in place by four studs. At the lowest point on the cap is located a small oil spoon, which dips into the oil and causes the splash. At no time does the connecting rod itself dip into the oil.

The intake is located on the right hand side of the motor, and has a T shaped manifold at the centre of which is attached a Schebler carburetor. The exhaust is located on the left side, and directly beneath the exhaust manifold are located the water circulating pump and magneto. The intake manifold, the exhaust manifold, the inlet water pipe, and the outlet water pipe are all held in place by four nuts, and all have taper points, no packing being used.

The inlet and exhaust valves are mechanically operated by separate cam shafts, which are located on opposite sides of the motor. The cam shafts are drop forged, with cams integral, the shaft being of 1½ inches diameter, and the cams of 1½ inches diameter. The cam shaft has three bearings, which are adjustable for wear. The front bearing is 3½ inches long, the centre 2¾ inches, and the rear bearing 2¾ inches.

The cam shaft gears are of manganese bronze, and are secured to the shaft flange by four 36 inch hardened dowel pins, and a lock washer and nut on the end of the cam shaft. These are blind pins, and it is necessary to remove the gear in order to know that they are there.

The valves are actuated by roller lifters of quite original design. The lifters are fitted with a coiled spring to take up the slack in the mechanism and obviate noise. At the top of the lifter guide is a small stuffing box to prevent dirt from getting into the crank case around the lifter, or oil getting out. The valve lifter guide is made large enough to admit of a small steel shell being pressed over the roller end. This shell is slotted on both sides; the roller pin is milled flat on both ends, and when assembled the slots act as guides to prevent the roller turning out of parallel with the cam. The rollers are hardened and ground, as are also the roller pins. The top ends of the lifters are drilled and tapped to receive the valve adjusting screw. which is held fast by lock nuts. The valve stem adjusting screws are of nickel steel, hardened.

The crank case is in two pieces, or really three, if the gear compartment cover is counted. The gear compartment is oil tight and integral with the upper half of the case. A stuffing box is used on the starting crank end of the crank shaft to retain the oil. The upper half contains all the bearings, the lower half being separate and independent in every way The bottom of the crank case is a separate compartment holding several gallons of oil, which is forced into the various compartments of the upper case by a gear pump driven off of the lower end of the timer shaft. The pump is let into the bottom of the crank case, where it forms a part of the case. The oil from the pump is forced through a single sight feed on the dash, part of it going through the gears, and the remainder flooding the various bearings. The oil is led to its several bearings through channels in the crank case. There are vertical standpipes in each splash chamber, which keep the oil at a constant level and carry the surplus oil back to the reservoir at the bottom of

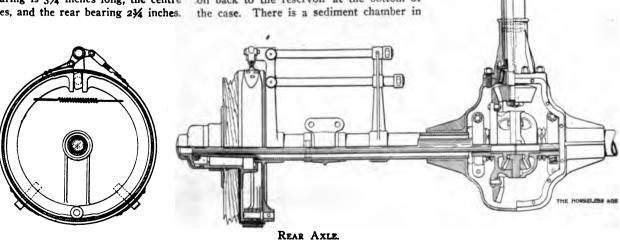
the centre of the oil reservoir, which collects the dirt or impurities in the oil before it is again used. This system is automatic, and requires no adjustment or attention other than to see that there is oil in the reservoir.

A large centrifugal water pump is gear driven from the exhaust cam shaft gear and is used in connection with a cellular radiator. The system holds 5½ gallons of water. A ball bearing fan is located back of the radiator, but independent of the radiator and mounted on top of the gear compartment. An eccentric bushing is used in the top of the fan bracket for the adjustment of the 1½ inch flat belt, which drives the fan at two and one-half times the motor speed.

Immediately back of the pump, and driven by the same shaft through a flexible joint, is located the Bosch magneto. On the opposite side in the centre, and driven by bevel gears from the intake cam shaft, is located the combined timer and distributor. Two separate and distinct ignition systems are used, with separate spark plugs. The spark plugs are located in the valve chamber caps, the battery set being located over the exhaust chambers and the magneto set over the intake chambers. The storage battery is carried in a water tight box on the running board on the right side of car.

The flywheel is of cast iron, 19 inches in diameter, and weighing 105 pounds.

The carburetor is fitted with a foot accelerator, and the inlet manifold with an auxiliary air inlet which is adjustable from underneath the steering wheel on the



steering column. A bleeder pipe is located on the top of the crank case, between the cylinders, to relieve crank case compression.

The motors are run light on the testing stand for twelve hours and under dynamo load with lights for six hours, cards and load readings being taken at different speeds.

A leather faced cone clutch is used, supported on the flywheel end of the crank shaft. The clutch is 15 inches in diameter with 234 inches face. Underneath the leather facing are eight flat springs I inch wide and 3 inches long, which gradually take up the load when engaging. A brake is arranged on the clutch pedal releasing yoke, which presses on a small drum on the clutch spring housing and stops the clutch from revolving when it is released, insuring quiet shifting of the gears. A heavy spiral spring keeps the clutch engaged until released by the clutch pedal or the application of the foot brake. A ball thrust clutch releasing collar is used. A ball thrust is also used at the outer end of the clutch spring. The clutch spring is held in place by a bolt screwed into the end of the crank shaft. This bolt is hollow and split on the thread end, and is locked by a taper bolt running through and tightened by a nut on the outside. The clutch may be removed from the car without disturbing the transmission or motor, owing to the use of a sliding double universal joint between the clutch and the transmission. A selective type transmission is used, with three speeds forward and reverse, with a direct drive on the high speed. Timken roller bearings are used on both ends of each shaft. The gears are of 31/2 per cent, nickel steel, case hardened and drawn in oil. Each of the two sliding sets is shifted by separate shafts operated by a single lever at the top of the gear casing. The gear casing is of aluminum and is located directly beneath the floor boards at the driver's feet. The speed lever works in an H slot with a lock to prevent going into reverse when shifting from a low gear into a higher, or vice

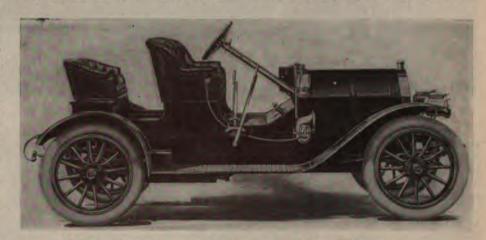
The propeller shaft is connected to the main transmission shaft by an enclosed sliding universal joint, which is lubricated by oil forced from the transmission case through a spiral groove on the main transmission shaft. The torque strains are taken by a swivel device bolted to the centre cross member of the main frame and supporting the universal joint, the propeller shaft and the tube in which the shaft is enclosed. Within this tube, which is attached to the bridge casing on the rear axle, the propeller shaft revolves on two Timken roller bearings, one at the forward end and one at the rear end next to the bevel driving pinion. These two bearings take up the end thrust also. Keyed to the rear end of the propeller shaft and secured by a lock nut is the hardened nickel steel main drive pinion, which engages the large hardened nickel steel driving gear. All the weight and load of the car is carried on heavy gauge steel axle tubes fitted into a

cast steel bridge casing centrally located between the rear wheels.

The differential gear, which is of bevel gear and pinion type, is mounted on Timken roller bearings, which allow for endwise adjustment. The inner axles are squared at the ends and fit into squared holes in the differential bevel gears on one end and the hub clutch plates on the other. The dust caps hold the clutch plates in place and make the axle oil tight. The rear wheels

Mitchell 1910 Models.

The Mitchell Motor Car Company, of Racine, Wis., have made no radical changes in the mechanical design of their cars for 1910, but they have completely modified their policy with respect to types. Where last year they produced motors of three-different cylinder sizes, they are this year using only one size of cylinder, of 4½ inch bore by 5 inch stroke. They have also put out a six cylinder model, which is



MITCHELL MODEL R-FOUR CYLINDER, 30-35 HORSE POWER ROADSTER.

run on Timken roller bearings on the axle tube end.

The front axle is a solid one piece drop forging of I section, with spring saddles forged integral. The front wheels run on Timken roller bearings.

The spark and throttle control levers are located on a stationary quadrant on top of the 18 inch steering wheel. An accelerator pedal is located at the left of the brake pedal. The inside hand lever at the driver's right operates the emergency brakes, the outside hand lever working in an H slot shifts the transmission gears. The left pedal operates the clutch; the right pedal applies the brakes.

The brakes are of the internal expanding and the external controlling types, respectively, both operating on the rear wheel brake drums. The internal brakes, operated by pedal, are the service brakes, and have a bronze to steel friction surface. The external emergency brakes are composition lined and operated by the hand lever.

The frame is of pressed nickel steel of channel section and is dropped at the rear. Semi-elliptic springs, 40 inches long, 2 inches wide and with six leaves, are used in front, and three-quarter scroll elliptic springs, 48 inches long, 2 inches wide and with six leaves, are used at the rear. The wheel base is 122 inches.

A five passenger body of straight line design is fitted. It is long and affords plenty of room between the front seat and the dash, with the steering column at an easy rake. The steering gear is of the worm and sector type. The gasoline capacity is 17 gallons. Thirty-six by four inch tires are fitted. The color is either red or green and the upholstering black.

an innovation for them. Their 1910 line will consist of three models, as follows: Model R, four cylinder, 30-35 horse power roadster,

Model T, four cylinder, 30-35 horse power, five

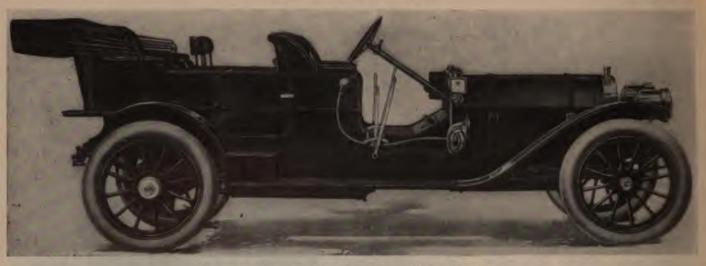
passenger touring car, \$1,350.

Model S, six cylinder, 50 horse power, seven passenger touring car, \$2,000.

The four cylinder touring car and roadster have the same specifications, except that there is one less leaf in the springs of the roadster, the rear axle is semi-floating instead of full floating, and the brake drums at 10¾ inches in diameter instead of 14 inches.

The cylinders are this year cast in pairs, instead of singly, as last year, and there are three bearings on the crank shaft of the four cylinder motor (instead of five) and five bearings on the crank shaft of the six cylinder motor. The general arrangement of, the valves remains the same, the exhaust valves being located in side pockets on the left hand side, and the inlets in dome-shaped extensions of the cylinders. The inlet valves are placed in cages. The cam gear and valve mechanism has been redesigned, and is now claimed to be absolutely noiseless in operation. The magneto and carburetor have been arranged differently on the motor, the magneto being now on the left hand or exhaust valve side. and the carburetor on the right hand side. The Splitdorf dual ignition system is used. A centrifugal pump has been substituted for the gear pump used last year, and is placed in line with the magneto armature and driven from the same gear. The cam shaft gearing is enclosed in a separate housing divided through the centres of the crank shaft and cam shaft.

Instead of the bracket secured to the



MITCHELL MODEL S, SIX CYLINDER, 50 HORSE POWER CAR.

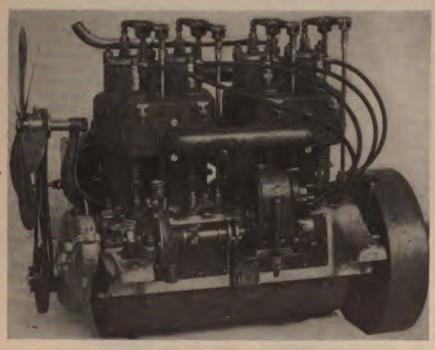
crank case by two of the retaining bolts of the forward cylinder, which was used in last year's models for supporting the radiator fan, a small bracket is now used which is secured directly to the forward cylinder casting. A mechanical lubricator is located on the right hand side of the forward pair of cylinders, and is driven by a rounl belt from the crank shaft.

The clutch is of the leather faced cone type, with springs under the leather for gradual engagement, the same as in former years. A decided change has been made in the arrangement of the transmission and rear axle drive. The transmission case and propeller shaft housing together form a torque member, which is supported from a cross member of the frame about midway between the front and rear axles. The change gear is connected with the clutch through a universal joint, and this is the only universal used in the driving mechanism. The transmission is of the

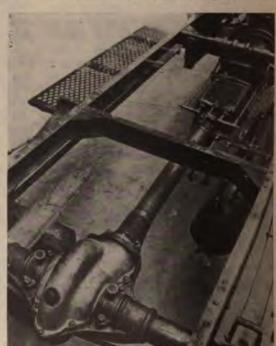
sliding type and is operated selectively. The two shafts are arranged one above the other. The main shaft is carried in ball bearings, and the lay shaft in Hyatt roller bearings, instead of roller bearings being used throughout, as last year. The H quadrant for the selective operation of the gear is located in front of the gear box, instead of at the side of the frame, as is customary. Since the propeller shaft housing and gear case serve as torsion members, no special torsion rod is required, but two radius rods extend from the rear axle to the side frames at a point near the suspension of the driving unit. An option is given on two rear axle reductions, viz., 31/4 to 1 and 33/4 to 1. The rear axle is fitted with ball thrust and radial bearings. The front axle is an I section drop forging made in a single piece without a weld.

The frame is of pressed steel, the section being 4 inches high by 1½ inches wide. It has three cross members and is provided with heavy gusset plates at the corners. The frame of the six cylinder car has a reinforcing plate in the channel. It is slightly inswept at the forward end. The frame is supported by three-quarter elliptic scroll springs in the rear in the four cylinder models, and platform springs in the six cylinder model. The front springs of all models are semi-elliptic, being 41 inches long by 2 inches wide. The three-quarter elliptic springs of the four cylinder models are 44x2¼ inches, while the platform springs of the six cylinder model consist of 45x2¼ inch side members and a 37x2¼ inch cross member.

The wheels have been increased in size. They have twelve spokes and are fitted with ball bearings and stamped hub caps. On the six cylinder model the front wheels are fitted with double annular ball bearings. The steering is by an irreversible worm and worm gear, so arranged that the gear can be shifted after it has worn at one place. The



Models R and T Engines, 30-35 Horse Power.



MITCHELL MODEL S CHASSIS, REAR VIEW,

wheel base is 100 inches for the roadster. 112 inches for the four cylinder touring car and 130 inches for the six cylinder touring car. The tread is the standard 56 inch, but a 60 inch tread is optional. The tire equipment is as follows: Roadster, 32x31/2 inch; four cylinder touring car, 34x31/2 inch; six cylinder touring car, 36x4 inch. The sod pan, which extends under the engine and back to the transmission, is held in place by spring hooks, which makes it readily detachable. On the four cylinder cars 16 inch steering wheels are fitted which have a natural finish. The six cylinder car has an 18 inch steering wheel of the same finish. The spark and throttle levers move on sectors below the wheel. The control devices are arranged according to standard practice, there being the usual outside brake and change gear levers, and clutch and brake

Waverley 1910 Models.

The leader among 1910 Waverley models is their new four passenger brougham Model 75-C, designed on lines similar to the four passenger coupé put out in 1909, but differing in some important particulars. Thus the car is 5 inches longer (911/2 inches), with a wheel base of 79 inches and a width of seat of 44 inches. The wheels are 2 inches larger, fitted with 32x31/2 inch tires front and rear. The springs are full elliptic front and rear, giving a much easier riding car. The battery is two cells larger (thirtytwo cells of eleven or thirteen plate), arranged with twelve cells in front and twenty cells in rear compartment.

The controller is of special Waverley design, which is claimed not to waste current and to be absolutely dependable.

Model 70-C Waverley coupé differs from Model 75-C chiefly in the form and size of the top, which accommodates but two passengers. Thirty-two inch wheels are used on this model, as well as on the new Waverley cars. Tires, however, differ from those on 75-C, being 32x3 inch front and 32x3½ rear, solid or pneumatic. A thirty cell, eleven plate battery furnishes the current, which is converted into power by the special Waverley motor used on all 1910 models, and transmitted to the wheels by the Type "K" driving system, described above. The controller is also the same pattern.

Model 76, the new Waverley victoriaphaeton, differs materially from the old type victoria of last year's make. The dimensions of the body are the same as those of Models 75-C and 70-C, and the





MODEL 75-C, WAVERLEY FOUR PASSENGER BROUGHAM.

MODEL 74, WAVERLEY STANHOPE, VICTORIA TOP.

pedals on opposite sides of the steering column, as well as the Mitchell corrugated arc accelerator pedal. The running boards are of pressed steel. Options are given on the following types of bodies for the different models: Model R, roadster body with either rumble seat, surrey seat or runabout deck; Model T, four passenger close coupled body or five pasenger touring body; Model S, four passenger close coupled road ster or seven passenger touring body. Special efforts have been made to produce bodies of attractive appearance, and the contour of the radiator has been materially changed with this object in view. All models are equipped with steel tool boxes, adjustable headlight brackets and tail oil lamps, a horn and a complete set of tools. including a jack.

The firm of D. P. Nichols, of Boston, have gone into the building of taxicabs and limousine bodies quite extensively. They are just completing an order for seventy-five taxi bodies for De Dion chasses for the New York Transportation Company and another for twenty-five limousines for a large importing firm.

It consists of a core, on which are assembled blades of various widths engaging in fingers to the frame of the controller. This system of knife blade contacts permits the passing from one speed to another without breaking contact. Four forward and four reverse speeds are available, and the circuit is never broken after the power is once applied. The controller is said to be non-arcing.

In the new Waverley driving system the motor is wholly attached to the body and has both the driving parts entirely encased and running in a continuous bath of oil. The motor and flexible gear case are combined in a single unit and assembled on crosspieces attached to the body frame. These are separated from the body by rubber cushions intended to overcome the effects of vibration. The power is transmitted by a flexible gear, a shaft parallel with the axle and a small herringbone gear on the rear axle. The wheel bearings are Timken roller bearings, but six Hess-Bright ball bearings are used on the gear and pinion shafts, all thoroughly protected from dust and carriage is interchangeable with these by the addition of a brougham or coupé top. For summer service a full leather victoria or buggy top is used. The old form of combined dash and fender has been changed. The increased length of body and wheel base gives an easier riding motion to the seat, and room is provided for a disappearing child's seat. Thirty-two inch wheels and full elliptic springs make this a particularly easy riding carriage. All the above models use the patented Waverley drop-sill.

The chief novelty of the season in Waverley electrics will be the new road-ster, Model 78, a gasoline type of gentleman's runabout with a folding rumble seat, large battery disposed in a long front hood, and an estimated speed of 25 miles an hour. As the first of these cars is not yet completed it is too early to give full specifications.

Model 74 Waverley stanhope is the same car as last year. The use of 32 inch wheels with solid tires is recommended on this car, although pneumatics are provided when desired. This is essentially a business or professional man's car.

# Pope-Hartford Automobiles for

The new model of the Pope Manufacturing Company for 1910 is known as the Model T. It embodies numerous changes over last year's models, which affect the vital points in the mechanical construction as well as adding to the beauty of the car. In the 1910 model the wheel base has been increased from 114 inches to 118 inches, and the wheels have been increased from 34 inches to 36 inches. Four inch tires are the standard equipment, while 4½ inch tires are put on the rear wheels of the seven passenger, limousine and landaulet.

The engine has four cylinders, which are cast in pairs, and it develops 40 horse power. This power is claimed to be sufficient to drive the car over any grades on the high gear that can be taken by the highest powered and highest priced cars, and to make over 60 miles on the level. The valves are all interchangeable, are located in the cylinder heads and are mechanically operated.

The transmission is of the selective type, with three speeds forward and reverse. The gears are made of chrome-nickel steel, with the ends of the teeth beveled by a new process so that the changing from one gear to another is accompanied by scarcely any noise. The clutch is of the inverted cone type, faced with leather, with cork inserts.

The rear axle is the full floating type, with special alloy steel shafts. The rear wheels run on roller bearings on an outside tube, which serves as a housing for the axle proper. In this type it is possible to remove the axle shafts and the entire differential construction with the car standing on its own wheels.

One of the most important improvements is in the lubricating system. A mechanical oiler is mounted on the crank case, and in addition to the regular pumps used in the 1909 models there are a large suction pump



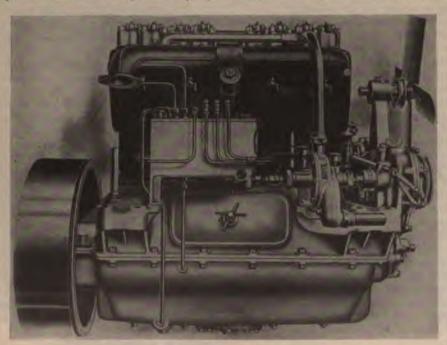
1910 POPE-HARTFORD MODEL T, TOURING CAR.

and a standpipe that permits the oil on reaching the level of the pipe to run back



STEERING KNUCKLE AND CONNECTIONS.

into the crank case. Underneath and cast integral with the crank case is an oil reser-



POPE-HARTFORD MOTOR,

voir. The crank case proper is provided with standpipes fitted with gauze strainers, making it possible to maintain at all times a predetermined oil level in the crank case. Oil is pumped from the oiler to the cylinders, and the main bearings are lubricated by splash from the crank case. The rear axle is lubricated by splash, and has pet cocks fitted in the axle case to hold the proper level of oil.

The transmission is lubricated by splash, and all other parts are provided with grease cups. The oiling system is said to require attention only every 800 or 900 miles.

A new style torque rod has been adopted. This is of trussed tubular construction, with its rear end pivoted on the rear axle case and the front end fitted with spring buffers and attached to a special cross member of the frame. The rear spring seats swivel on the rear axle, and the rear springs are shackled at both ends. The drive is taken by two adjustable radius rods, one at each end of the axle. The rear end swivels on the rear axle tubing, and the front end, consisting of an adjustable ball and socket joint, is attached to a special bracket located on the frame.

Improvements have also been made in the design and construction of the bodies. The straight line effect has been strictly adhered to, thus doing away with many of the little crevices and pockets that formerly caught and held so much dust and dirt and were so hard to keep clean. The different bodies are all built on the same chassis, the only difference being made in the roadster. Here the engine is set a few inches further back in the frame. This makes a little longer and "smarter" hood. The steering column is tilted more than in the other models, to bring the steering wheel comfortably into the reach of the driver. The seats also are a trifle lower. The prices of the different models are as follows: Pony tonneau or roadster, \$2,750; seven passenger touring car, \$3,000; limousine or landaulet, \$3,750.

The Willys-Overland Company have started work on a five story, 600x100 feet, addition to their Toledo, Ohio, plant, which will be used for the finishing department. The building is to be ready for occupancy in forty days.



W TORSION ROD AND RADIUS ROD OF POPE-HARTFORD.

he Delco Ignition System.

Dayton Engineering Laboratories any, Dayton, Ohio, have brought out tery ignition system which presents points of decided novelty.

system is essentially a single make eak arrangement with individual coils aster contact breaking device, an ordiommutator being used to time the ignitial individual solutions. It is so arranged that it should be lingly economical of current, and it med that it will ignite the motor of a cylinder car for 2,000 miles of runfrom a battery of six dry cells of the ry size. Special attention has been making the apparatus free from arcthe contacts, so that adjustments may required, and the statement is made here should be no need of attention kind until after 20,000 miles of ser-

apparatus comprises three essential-the coil box, the relay case (containe make and break), and the switch lition to these is the timer or compr, which may be of any good make coil box is of steel armored constructed made perfectly tight, so as to be oil and water proof. It contains the ed number of simple, non-vibrating four in the case of a four cylinder

The four high tension terminals out of the top of the box, through conical insulating bushings, and the adividual primary binding posts and amon primary connection are mountent the under side. Between each pair ondary posts is a grounded brass ted with discharge terminals, which safety spark gaps for the coils and to protect the same against breaking in case of an accidental detaching of tension cable from its plug. By go with a screwdriver from the brass the high tension terminal, any cylnay be cut out when testing is being

performed. This coil box is intended to be mounted under the hood directly upon the motor, on brackets arising from it, and the secondary cables required are thus very short.

The circuit breaker or controlling relay is also housed in a pressed steel case of cylindrical shape, and is always mounted under the hood, being held by the same brackets which support the coil box or by a special bracket fastened to the front of the dash. Its function will be explained later.

It is a characteristic of this system that no

part thereof, except the switch, is mounted upon the face of the dashboard, and a very



CONTROLLING RELAY.

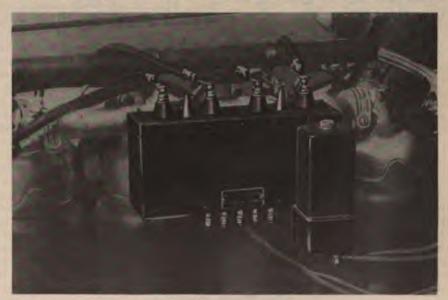
neat and unobtrusive arrangement is the result. The switchbox is entirely of metal

and the mechanism is very thoroughly insulated and provided with substantial nontarnishing contacts. It is of the swinging lever type and is made ruggedly enough to be safely operated by the foot. The lever has three positions—"battery," "magneto" and "off." In the upper portion of the switchbox is a button which, when pressed in, causes the single break apparatus to act as a vibrator and furnish a continuous succession of sparks to the cylinder which is ready to fire. This button will not remain pressed in unless the switch is in the "off" position; but if it is the button will hold the contact, but will immediately fly out and cut off the vibrating action when the switch is thrown either to the regular battery side or to the magneto position. In starting from the seat the button may be pressed with the foot, and if the motor starts the switch may be kicked over to either side, dependent upon which system is to be used. the button releasing and the vibrating action immediately ceasing thereupon. In case the motor does not "spark up" the button will remain pushed in and the motor may be cranked in the usual manner, there being a succession of sparks so long as the timer is in contact. When the motor is started in this manner a kick of the switch to one side or the other terminates the vibrating action of the make and break.

A key is furnished which locks the switch so that neither the button nor the lever can be operated, and the lock is so arranged that it cannot be operated by any other means than its own key.

Starting can readily be accomplished by means of the single spark normally furnished by the system, but the spark from the vibrating break is more effective when the motor is cold.

The system is connected up in a manner similar to the ordinary master vibrator system with multiple coils, the free sides of each coil unit primary being connected to a segment of the timer, and the common terminal of the coil primaries being attached



DELCO IGNITION SYSTEM ATTACHED TO FOUR CYLINDER MOTOR.

to one side of the battery. The other side of the battery goes through the pair of master contacts in the controlling relay case, through the switch and to ground.

The main peculiarity of the system lies in the fact that the contacts controlling this circuit are operated by a relay magnet, which is separate electrically from this main circuit, but which is in a circuit also including the timer and the battery.

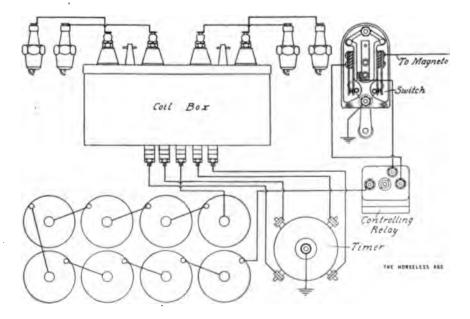
The relay magnet is of high electrical resistance, and passes but a minute current. It is mounted in its case with its core vertical, and acts upon a light armature pivoted horizontally above it. The other arm of the armature element is vertical, the arrangement being in bell crank form, and this arm acts upon the main circuit contacts, which are of platino-iridium and normally in contact under a delicate spring tension. When the relay armature attracts its armature these contacts are separated and the main circuit through the battery timer and coil is interrupted. When the relay magnet is de-energized the spring of the contacts brings them together again. The only adjustment provided is a movable ratchet toothed piece at the upper end of the magnet core, which determines the pressure between the contacts, and this, it is stated, should require no adjustment during the life of the car upon which it is used. A well proportioned condenser is doubtless used around the contact points of the make and break, and it is a fact that absolutely no spark can be observed at the points when the engine is running.

The action of the arrangement is as follows: Supposing the timer not to be in contact, the relay magnet is not energized and the circuit at the controlling points is closed, but no current passes in the system on account of the break at the timer. When the timer touches a segment the circuit through one of the coils, the battery and

the controlling contacts is closed, but the circuit is also closed through the branch circuit, including the timer, battery and relay magnet. The relay magnet is at once energized, it draws down its armature and opens the controlling contacts, breaking the circuit through the coil and producing a spark of high intensity. On account of the high winding of the relay magnet sufficient time elapses before the break to allow for the proper building up of the coil. Although the main circuit is thus broken, the relay magnet circuit is held completed and the controlling contacts are held separated until the timer contact leaves the segment, when the relay circuit is also broken and the initial conditions are restored; thus the main circuit is closed only long enough at each ignition adequately to saturate the spark coil which may be in circuit, and the current consumption is thus reduced to a minimum, which is stated to be 0.15 or 0.16 ampere at 1,000 engine revolutions. As the duration of the contact required by each ignition is constant, depending upon the electrical characteristics of the relay magnet, the total consumption of energy per unit of time is almost directly as the number of ignitions or the engine speed. Not over 0.04 or 0.05 ampere is said to be drawn from the battery at low engine speeds.

It is especially to be observed that the main ignition current is not broken at the timer, but at the controlling contacts, and the only current which the timer is called upon to rupture is the minute current which passes through the high resistance relay magnet. Burning of the timer brush and segment, which is the cause of most timer trouble, is thus eliminated.

This system is applicable to any car, and is estimated to operate with one-third the battery energy required by a good vibrating coil outfit.



DELCO WIRING DIAGRAM.

#### The Wico Igniter.

The Witherbee Igniter Company, of Springfield, Mass., whose New York office is located at 1876 Broadway, have entered the market with a novel ignition system.

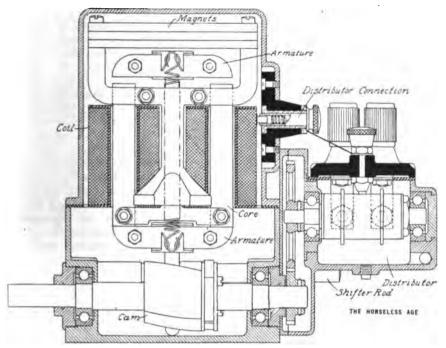


WICO IGNITER.

Their device, which is known as the Wico igniter, resembles a high tension magneto in many respects, but it has this advantage over the latter device, that the intensity of the spark generated is entirely independent of the speed at which the device is driven; consequently, a motor may be started by cranking slowly and need not be hurled around rapidly, as is generally required with magnetos. It is, however, not even necessary to crank the motor if there is any charge left in the cylinders, as a spark may be produced with this system by a simple back and forth movement of the ignition timing lever, and thus the motor started from the seat.

In the Wico igniter the necessary current is generated by mechanical means driven from the motor. Those who are familiar with high tension magnetos know that in these magnetos the current is produced in the secondary winding on the armature by suddenly short circuiting the primary winding and thus decreasing the lines of magnetic force passing through the secondary coil. The action in the Wico igniter is somewhat similar, the lines of magnetic force through the secondary coil being also suddenly decreased, but in a different manner than in the magneto.

Referring to the accompanying illustrations, it will be seen that the igniter is of somewhat similar form to a magneto and is encased in a metallic housing. As may be seen from the sectional view of the igniter, a set of permanent magnets is located in the upper portion of this housing. The magnetic circuit of these permanent magnets is ordinarily closed through soft iron pole pieces, the cores of a double high tension coil and an armature connecting the lower ends of these cores. The magnetic lines of the permanent magnets, therefore, normally pass from the north pole of these magnets through the pole piece connected thereto, through one of the cores of the double high tension coil, through the armature at the lower end of the two cores. and back through the other core and the pole pieces to the south pole of the magnets. Between the permanent magnets and



LONGITUDINAL SECTION.

the pole pieces thereof is located a movable armature, which is drawn toward the upper ends of the cores of the double coil by means of two long coiled springs. The movement of this armature is controlled by the coiled springs on the one hand and by a vertical rod on the other, which rod at its lower end bears on a cam carried on the driving shaft of the igniter. This cam is slidably arranged on the driving shaft and is provided with a groove which engages a shipper lever connected with the timing lever on the steering post. When the igniter shaft is rotated the cam will raise the movable armature through the intermediary of the armature rod, and after the highest point of the cam is reached the armature will quickly be drawn down onto the ends of the coil cores by the two coiled springs. The coils are then short circuited magnetically; the magnetic lines of the permanent magnets, instead of passing through the cores of the coils, return through the pole pieces and the movable armature. The sudden diminution of the magnetic flux through the coils induces a high voltage impulse in the coils, which latter are provided with only a fine wire winding. The cam surface is helical, and by shifting the cam along its shaft the spark can be produced at an earlier or later period; also, by shifting the cam to the limit of its motion in the direction of late firing, the armature is raised onto the shoulder, and by then moving the cam to the earlier firing position, the armature drops and thus generates a spark. In this manner the motor can be started on the switch (or perhaps it would be better to say on the timing lever) by means of this device.

One terminal of the double high tension coil is grounded, and the other one is led out through the wall of the casing by means of a thoroughly insulated connector plug. From this connector plug connection

is made to the central terminal of the high tension distributor. The latter is of the drum type, instead of the more common disc type. Its shaft is driven from the main shaft of the distributor by a half time reduction gear. The shaft carries a drum of insulating material to which are secured segmental contact vanes of hardened steel, which revolve in contact with hardened steel buttons in a bath of oil, by which means the central terminal is brought in contact successively with each of the four high tension distributor terminals (in the case of a four cylinder machine) from which connection is made to the spark plugs. Both the main shaft and the distributor shaft are mounted on annular ball bearings.

It will be observed that there is no electric circuit breaker used in connection with this device, consequently there is no need for a condenser to obviate sparking, and the need of adjustment is also obviated. The cam and the wearing surface of the armature bar are liberally dimensioned and carefully hardened, and they run in a bath of oil, so they may be safely counted upon to have a long life. The springs are said to be made of the highest grade of steel wire, and the tension under which they are operated is very small in proportion to the strength of the material. There are no moving wires in the system. All parts of the igniter are enclosed in a dust and water proof housing of aluminum. The igniter is entirely self-contained. The range of spark timing is limited only by the requirements of the motor to which the igniter is fitted. For four cylinder, four cycle motors the igniter runs at engine speed, and for two cylinder, four cycle motors at cam shaft speed. We understand that the device can be fitted to any make of car in place of a magneto, and can be furnished to run in either direction.

### New Locomobile Limousines.

The new 30 horse power chassis of the Locomobile Company of America for 1910 may be fitted with a limousine body, and a design has been evolved which is claimed to be specially handsome and commodious. This vehicle will accommodate six or seven persons, five of them inside, all of the inside passengers facing forward. Although the body is quite large the car can be readily handled in traffic, as it can be turned round in a 38 foot street without backing. While the car is particularly adapted for suburban work, it is claimed to have sufficient speed and power to make it suitable for touring. Closed cars may now be heated by means of the exhaust gases or by means of electric stoves, and it is even possible to prepare hot beverages in the car while on tour.

### Stoddard-Dayton Addition.

Inability to supply the demand for their cars during the past year has caused the Dayton Motor Car Company to add some 150,000 square feet of floor space. This is in the shape of a six story addition to their former six story building. Besides this building they have acquired and equipped a large foundry in which all their cylinder and other castings are made, as well as all aluminum, bronze and brass parts. The new building will be used partly as a machine room and partly for assembling; in fact, the various departments on the six floors of the original building will simply be spread out over the new space. This does not apply, however, to the body shop, which seems already to be adequate. When this building is completed, which will be within ten days, the company will operate their own drop forge room, in which will be forged their crank shafts, axles. gear blanks, lamp brackets, small rod ends, turnbuckles, etc.; their own complete foundry, their own body building shop, trim shop and paint shop, and their machine shop, in which their motors, transmissions, axles, steering gears, etc., are made.

In their drop forge plant they also make and temper their springs and treat all steel parts. A portion of the new building is given over to the immense frame presses, where all frames are formed and finished. A laboratory has recently been added for testing all materials, both before and after treatment.

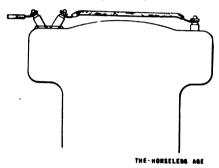
The number of automobiles in service in France at the end of 1908 is stated to have been 37,586, as compared with 31,286 at the end of 1907, and 26,262 at the end of 1906. The average horse power of the cars in use at the end of 1908 was 13.28, as compared with 5.06 at the end of 1899. Of the 37,586 vehicles in use last year 15,338 were used for business purposes and 22,252 for pleasure only.



# Two Simultaneous Sparks in a Cylinder.

Editor Horseless Age:

In a recent automobile publication I saw the exposition of a method of obtaining practically two simultaneous sparks in one cylinder by leading the high tension current from the distributor to a "single pole" spark plug, so set in the cap over the inlet valve that its sparking point would come in sufficiently close proximity to that of a



second "single pole" spark plug to provide a sparking gap. From the head of the second "single pole" plug a cable leads to an ordinary spark plug located over the exhaust valve, the action of the current being to jump the gap between the two "single pole" spark plugs and then pass over to the ordinary spark plug, thus creating two sparks in the cylinder—one over the inlet and one over the exhaust valvewhich, while not being precisely simultaneous, are practically so. The accompanying sketch will convey the matter in a more comprehensive manner than my description. In relation to this may I have your kind advice in the following, referring to a four cylinder, T head motor, 45/8x5 inch, the ignition of which is furnished by a low tension magneto with single step up coil:

- I. Is the method of creating two sparks, as above described, an efficient one in your opinion, and will it increase the power output of motor?
- 2. Will each of the two sparks possess the same intensity as would one spark delivered by the same magneto through a single "ordinary" spark plug?
- 3. Would there be a sufficient approach to synchronism of the two sparks to produce the advantages of firing a charge from two points at the same moment?
- 4. Is there any method other than that above outlined of obtaining simultaneous sparks in the same cylinder, where a magneto is the source of ignition?
- 5. Would it follow, as a consequence of firing a cylinder from opposite sides at the same moment, that a considerably less spark advance would be necessary to obtain maximum engine power than would be the case when operating with a single

spark? (This question is particularly pertinent to power output in hard pulling on grades with wide open throttle, when spark has to be retarded as engine speed decreases.)

6. Is a "single pole" spark plug made, and in what character of ignition service is it used?

P. I. B.

[The method described of producing two simultaneous sparks is the only possible one that we know of. We have no actual data of tests at hand, but we do not believe that the two sparks would have any appreciable effect upon the power output of the motor. This system of double sparks is sometimes used in the very largest of stationary engines.

If the spark gaps are of the same length in the two plugs in series, as in the case where only a single plug is used, then the intensity of each spark for a certain speed of revolution of the magneto will be somewhat less.

The two sparks occur absolutely at the same time, so far as practical considerations go.

We do not know of any other method of producing two simultaneous sparks in the same cylinder with an ordinary magneto without making some changes in the system. If the coil of the magneto were altered so that both high tension terminals are insulated instead of one terminal being grounded, then you could use two ordinary spark plugs to produce two simultaneous sparks, one high tension lead on the coil being connected to the central terminal of one plug and the other high tension lead to the central terminal of the other plug. The spark would then jump from the central terminal to the shell in the first plug, and from the shell to the central terminal in the last plug.

We do not believe that the production of two simultaneous sparks would have any appreciable effect upon the spark advance required. It was formerly thought that the spark advance was required because it takes the charge an appreciable time to burn, and as the time available is smaller when the engine runs at high speed, the charge must then be fired at an earlier period. It is now known, however, that the chief reason for the necessity of advancing the spark is that the vibrator in vibrator systems requires a fixed time to act, and this corresponds to a larger angle of crank motion when the engine runs at high speed than when it runs at slow speed. With mechanically operated make and break devices as furnished with high tension magnetos very little advance is required, and it is becoming quite customary to discard the spark lever on cars where this system is used and run on a fixed spark. Improperly proportioned charges burn, of course, slowly, but in perfectly proportioned charges the flame travels extremely rapidly.

There are no single pole spark plugs on the market at the present time, so far as we are aware, but you might be able to get them from the Cadillac Motor Car Company, of Detroit, as this type of plug was used in the single cylinder Cadillac car which was marketed for a number of years. The single pole spark plug differs from the ordinary spark plug only in that the inner end of the central terminal, instead of being bent to come close to the shell, is made longer and bent so as to come close to the end of the corresponding terminal of the other plug.—ED.]

# Calculation of Stresses in Differential Gears.

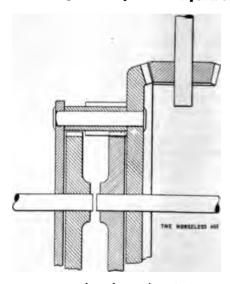
Editor Horseless Age:

As a subscriber to your paper I would like to ask a question that recently came up, and which is puzzling me. It concerns a Franklin Model D 1909 car. The motor of this car develops 28 horse power at 1,500 r. p. m. The transmission reduction is 3½ to 1, and the rear axle reduction 3¾ to 1. I want some method of finding the maximum fibre stress per square inch in the differential spur pinion. The accompanying sketch shows the arrangement of the differential. If I have not given all the necessary data, you may assume the quantities that are lacking, as it is the method of calculation that I desire particularly.

W. H. LEAVENWORTH.

[It may at once be stated that there is no method for precisely calculating the stresses in toothed gearing, but it is possible to make an approximation, and an attempt at this for the case in question will be made in the following:

If the engine develops 28 horse power at



1,500 r. p. m. then the engine shaft torque is

 $_{1500} \times _{2} \times _{3.1416} = 98.06$  pounds-feet.

The torque on the two rear axle shafts when the low gear is in mesh (neglecting losses in transmission) is then

98.06  $\times$  3½  $\times$  3½ = 1,224.5 pounds-feet. Only one-half of this torque comes on each of the rear axle shafts and on each of the spur gears secured thereto; that is, 612.25 pounds-feet. From this we can easily figure the pitch line pressure, if we know

the number of teeth in the rear axle spur gears and their diametral pitch, from which the pitch diameter can be calculated. Let us assume that the pitch diameter is 12 inches, which would make the radius onehalf foot. The pitch line pressure on the rear axle spur gears would then be

$$\frac{612.25}{1}$$
 = 1,225.5 pounds.

Usually there are three sets of pinions in a differential gear, and assuming this to be the number in the case under consideration, then the tooth pressure at each pinion is 1,224.5 + 3 = 408 pounds.

In spur gearing all of the pressure never comes upon one tooth, as another pair of teeth always comes into contact before one pair passes out of contact. According to Unwin the maximum pressure on each tooth is equal to from one-half the pitch line pressure to the full pitch line pressure, depending upon the least number of teeth. The pinions of a spur differential always have a very small number of teeth, and it will not be far from the truth to assume that the tooth pressure is equal to the pitch line pressure. (For average cases Unwin recommends to use two-thirds the pitch line pressure for the tooth pressure.)

Having thus determined the pressure on each tooth, the next thing is to find the stress which this pressure will cause in the material of the tooth. It is customary to regard a tooth as a cantilever, with the load applied at the end. Let L represent the load, h the height of the tooth, w the width of the tooth, and t the thickness of the tooth at the base. Then, according to the well known formula for cantilever beams, the maximum stress

$$S = \frac{Lht}{2I}$$

where I is the moment of inertia of the section under stress.

$$I = \frac{w t^3}{12}$$

Substituting this value of I in the above equation for the stress we obtain

$$S = \frac{Lht}{2wt^3} = \frac{6Lh}{wt^2}$$

The tooth pressure is, of course, the same on the pinion tooth and the gear tooth, but usually the pinion tooth is the weaker of the two, because with the small number of teeth in the pinion the teeth are usually undercut, and the bases of the pinion teeth are smaller than the bases of the gear teeth. In this particular case, however, the pinion teeth are strengthened by the fact that they are of greater width than the gear teeth, and the gear teeth are therefore probably the weakest. In substituting in the above equation for t it is therefore advisable to take the thickness of the gear tooth at the base.

You do not give the dimensions of the pinions and gears in the differential, and it is therefore impossible for us to figure the actual stress in these parts. We will illustrate the method, however, by assuming the dimensions. Suppose that the pinions have twelve teeth of 8 pitch, and that the face of the gears is five-eighth inch. In that case

$$h = \frac{1}{4}''$$
 $w = \frac{8}{5}''$ 
 $t = 0.2'' \text{ (approx.)}$ 
 $L = 408 \text{ pounds.}$ 

Consequently  $S = \frac{6 \times 408 \times \frac{1}{5}}{\frac{5}{5} \times 0.2 \times 0.2} = 24,480 \text{ lbs. per sq. in.}$ 

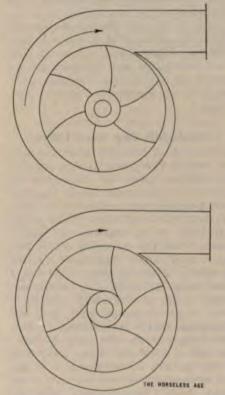
# Centrifugal Pump Designs.

Editor Horseless Age:

Would like to ask which of the two designs enclosed is the more efficient and to what extent. Does the direction of the curve of the blades affect the speed of rotation, and how much?

J. J. JENNINGS.

[Both of the designs seem to be quite practical, but we consider the upper one



SUGGESTED CENTRIFUGAL PUMP DESIGN.

the best, as the blades are slightly curved backward at the outer ends. As the water passes from the space between the blades into the diffuser its velocity parallel to the circumference of the wheel is reduced, and the backward curve of the blades facilitates this change in velocity and reduces the friction. It is quite impossible to give any figures for the difference in efficiency of the two designs.

The speed of rotation depends only on the speed of the driving motor and on the gear ratio. The curve of the blades would, however, slightly affect the rate of delivery.—Ep.]

### Rear Cylinders Sooting.

Editor Horseless Age:

I am having trouble with a Winton Model K. The two cylinders next to the dash will persist in sooting up, while the two front ones will remain perfectly clean. The compression seems good and the explosions are of about the same power. I don't think it is due to oil. We use Anti-Carbon and have cut down the oil to less than for the two front cylinders. The rings must be O. K., and I don't believe the oil is working past them.

I note that if a little increase is made in gasoline at the needle valve, the plugs in those cylinders seem to soot more and the front cylinders still show clean spark plugs. For that reason I thought the inlet valves might have something to do with it. As you know, this car has an air governing system. It might be that the air leaks out faster under one valve than another and one cylinder takes a larger charge, but I don't notice much difference in the explosions. I note, however, that one rear cylinder misses at times or has weak explosions.

I took the brass cap off of the dashpot over the inlet valve of this cylinder, and there were times that it chattered or jumped up and down a few times when first seating against compression. This, of course, would let out some of the charge and weaken the explosion or prevent it entirely. I expect to take out all the valves and regrind them if necessary and clean them up, and perhaps tighten up all the inlet springs a little and measure the tension on them if necessary I thought I would also put a gauge like the compressometer on one cylinder at a time and run the engine at a fixed speed, and take a comparative compression running. I rather think the rings are some of the cause.

C. E. F.

[The sooting must be due either to too much oil or too much gasoline, or both. It is not likely that the air governing system has anything to do with the trouble, as any defect in it would only affect the quantity of the charge admitted to the different cylinders and not the quality. If the trouble is due to air leaks, these leaks must be in the forward cylinders. They might require such an adjustment of the carburetor, in order to get a combustible charge into the front cylinders, that too rich a charge would be fed to the rear cylinders You can test this by observing the exhaust. If it contains black smoke (blue smoke is oil smoke), there is too much gasoline in the charge, and there should be a difference observable in the darkness of the exhaust from the front and rear cylinders respectively.

Too rich a mixture in the rear cylinders might cause the sooting, but in the majority of cases sooting is due to oil. You might get a good idea as to the actual cause by running the engine with the muffler off and closely observing the exhausts. If the trouble persists it may be advisable to provide external spark gaps in the circuits of the two rear cylinders, which, as you are probably aware, prevents failure of the ignition due to sotting. The soot would then not be objectionable until the coating became so heavy that it caused preignition.

—Fn.]

# Dry Cell Tests.

Editor Horseless Age:

On page 218 of No. 8, Vol. 24, you publish an inquiry, your reply, and a diagram of connections covering test of dry cells. The writer is rather at a loss to understand or rather reconcile your diagram to the statement in the article. The proposition mentions that twenty cells were in use, connected in two sets of ten. Presumably these two sets were so connected as to use first one and then the other. The diagram, however, shows that all the cells were in use simultaneously. Being connected in multiple series, either side of the two pole switch would pick up the entire battery, and eleven cells are shown in each series.

M. H. MOFFETT.

[Our understanding was that all of the cells were used simultaneously, and our reply was based on this assumption. Our correspondent, M. B. Johnston, informs us that the diagram was wrong, in that only five cells should have been shown in each row, instead of eleven. He adds that in the tests twenty cells were used simultaneously, ten of one make and ten of another, in four series of five each.

We would point out in this connection that a better method of making a comparative test of dry cells would be to connect the cells of different makes in series. Generally six dry cells are used in series, and three of each make could be used, or if two rows of six were employed, three of each make could be placed in each row. The advantage of this arrangement would be that the same current would then always pass through both makes of cells, and when the cells of one make became exhausted this would be indicated by misfiring. A simple voltage test would then show the state of discharge of each cell.—ED.]

# Berkshire Motor Car Company Reorganized.

The Berkshire Motor Car Company, of Pittsfield, Mass., has been reorganized with the following officers: John McQuaide, president and treasurer; Dr. William J. Mercer, vice president, and the foregoing together with Michael L. Casey, John White, Dr. O. S. Roberts, Clement Coogan, Henry Ryan and Harry Belcher, directors. Mr. Belcher has been superintendent of the company's plant from the start, and will continue to act in the same capacity. The company turned out about thirty cars the past year, and it is now planned to increase the capacity by leasing additional floor space in the Whittlesey building,

# Results of Munsey Tour.

In the Munsey Tour, which came to an end at Washington, D. C., on Wednesday of last week, only one contesting car, the Elmore, driven by Frank Hardart, Jr., of Philadelphia, came through with a perfect score, and this car was awarded the sweepstakes prize. The winners in the different classes and their scores were as follows:

			Points
Class.	Price.	Winner.	Penalized.
ı—\$	850 and t	ınder, Ford	6.9
2—\$	851 to \$1,	250, Maxwell	37.0
3-\$	1,251 to \$	2,000, Crawford	51.2
4\$	2,001 to \$	3,000, Elmore	0.0
5-\$	3,001 to \$	4,000, Am. Simple:	x 0.9
6—\$	A.oot and	over. Renault	

The Croxton-Keeton Motor Company, of Massillon, Ohio, who had two cars in the contest, withdrew them at New York. They inform us that the 45 horse power German type arrived at New York with a perfect score, and the 30 horse power French type was penalized four and onehalf points for breaking an unessential bolt. Their vice president, Mr. Bernhart, was threatened with a very serious illness on account of the wet weather encountered. and on the arrival of H. A. Croxton, their president, conditions were such in their New York branch that they demanded the immediate use of these entries for demonstration purposes, consequently they were with-

#### Vanderbilt Cup Race Plans.

The A. A. A. last week granted a sanction for the Vanderbilt Cup race, which is to be held on October 30. The course this year will be considerably shorter than last year, measuring only 12.64 miles, of which 5.15 will be on the Motor Parkway and 7.49 miles on the highways of Nassau County. This year the entries will be limited to stock chassis. The course is briefly as follows: From the grand stand east 2 miles along the parkway to Massapequa Lodge, thence in a northerly direction 2 miles to the Massapequa road, along the Massapegua road to the outskirts of Hicksville Village; thence west along the country road to Westbury; thence south back to the parkway at Meadowbrook Lodge, and thence along the parkway back to the grand stand. Simultaneously with the Vanderbilt Cup race the Long Island Motor Sweepstakes will be held. The Vanderbilt Cup race is open for stock chassis of Classes 1 and 2, Class 1 comprising cars with 451-600 cubic inches piston displacement of a minimum weight of 2,400 pounds, and Class 2 cars of 301-450 cubic inches piston displacement of a minimum weight of 2,100 pounds. The entry fee for the Vanderbilt Cup race is \$500 per car. The circuit of 12.64 miles is to be covered twenty-two times, which makes the total distance to be run 278.08 miles. The Sweepstakes comprise an event for Class 3 for the Wheatley Hills Trophy. This class comprises cars of 231-300 cubic inches piston displacement, of a minimum weight of 1,800 pounds. The distance to be covered is

189.6 miles, and the entry fee is \$250. Also an event for Class 4 for the Massapequa Trophy. This class comprises cars of 161-230 cubic inches piston displacement, of a minimum weight of 1,500 pounds. The distance is 126.4 miles, and the entry fee is the same as for Class 3. Entries for all of the events close on October 25.

#### Preparations for Atlanta Show.

A fund is at present being raised in Atlanta, Ga., for entertaining the manufacturers, salesmen and others who will attend the automobile show there next month. It is stated that already over \$15,000 has been received by the executive committee. In order to take care of the large number of visitors which are expected at Atlanta during the show, a public comfort department has been established, with S. C. Dobbs as chairman, which will engage to find lodgings for visitors. Invitations to attend the show will be sent out to every dealer and garage man in the District of Columbia, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Texas, Alabama, Mississippi, Louisiana, Arkansas, Missouri, Kentucky and Tennessee. In addition, about 1.100 invitations will be extended to carriage dealers in the above States. Those to whom invitations have been issued will be admitted to the show free.

### Every Town Its Own Auto Factory!

The following is from the Findlay (Ohio) Jeffersonian, and is characteristic of a movement that pervades the Middle West. Similar articles have appeared in numerous other country papers recently:

"Findlay ought to have an automobile factory.

"In recent years the automobile industry has had a marvelous development, and the near future promises it further growth equally great. Despite its rapidly increasing number of automobile factories, the United States has a heavy import trade in motor cars. The demand is such that more factories are bound to spring up throughout the country, and Findlay should have one of these plants.

"Findlay has plenty of capital, which, it seems, could be employed profitably in this line. There are auto enthusiasts here who should take hold of the matter. It is a proposition deserving of their consideration.

"Not a great deal of capital would be required, and the market is waiting.

"The farmers are to be heavy purchasers of autos for some years to come, as they will be the people with money. With the prosperity that has come to them they will not be content to move slowly along the highways taking the dust of others when they are able 'to make the dust fly' themselves. So many farmers now have autos that it is the subject of special comment by Secretary of Agriculture Wilson.

"It is up to Findlay automobile people to launch the project, get a competent manager and go ahead."

# Commercial Applications.



### Taxicab Developments in Boston.

In connection with the article "The Taxicab Business in Boston and Vicinity," which appeared in our issue of August 25, we are informed that the Taxi-Motor Cab Company, of Boston, have a maintenance contract with the Shawmut Tire Company, of Boston, who keep two men at the taxicab garage day and night for the purpose of shifting and repairing tires. The company are changing over from the rear wheel taximeter drive to the front wheel drive, and in a short time all of the taximeters on their cabs will be driven from the front wheels. The company have placed orders for a considerable number of cars, and expect to have between 100 and 125 in service late this fall. They have lately taken a long term lease on the Cyclorama Building at 541 Tremont street, which affords storage space for 250 cars. They also have a number of Pope-Hartford touring cars in service, which are rented by the hour, day or week, and they expect to considerably extend this part of the business.

#### Chicago Taxicab Combine.

The Automobile Transportation Association was incorporated at Springfield, Ill., on October 1 by O. H. Fay, of the Owen H. Fay Livery Company; John B. Haartz, secretary of the Walden W. Shaw Company, and Arthur B. McCoid, counsel for the Chicago Auto Livery Company, all of Chicago. In the incorporation papers it is stated that the association is organized for the mutual benefit of its members, and is of the "not for profit" class of corporations. Besides the firms represented by the incorporators, the association comprises the City Motor Cab Company, which is represented by John Borden, and the Auto Taxicab Company, represented by Max Morris. The above are the five most important taxicab operating concerns in Chicago. The objects of the association are stated to be the regulation of taxicab schedules and the protection of the members against attacks by legislation and against ruinous competition. It is understood that the five concerns comprised in the association will adopt a standard taximeter and a standard schedule of charges.

### Commercial Notes.

The owner of the automobile line between Mt. Pleasant and Wheeling, W. Va., is reported to be planning to establish a similar line between Blaine and St. Clairsville, Ohio.

The Taxicab Company of Baltimore, Md., have secured a building at Howard and Franklin streets, which they will occupy October 15. They have recently ordered fifteen more taxicabs from the Autocar Company, which when delivered will give them thirty-one all told. They have stands at the Union Depot, the Camden station and all the hotels except the Renner.

The Seattle (Wash.) Taxicab Company suffered a loss during the past week of \$285 contained in seven change sacks, turned in by various drivers, which were stolen by the night dispatcher of the company.

The Pacific Car Company, of Tacoma, Wash., inaugurated a taxicab service on October I. Six Cartercars are used. Stands have been secured at the leading hotels, the main office being at 717 South C street. C. L. Ross is manager of the company.

The Autocar Company, of Ardmore, Pa., on September 30 delivered five new motor mail wagons to the post office in Philadelphia. They are first to be used tentatively, and if found satisfactory the mail in Philadelphia will in future be handled exclusively by motor cars.

The Frank Bird Transfer Company, Indianapolis, Ind., have purchased three Coppock taxicabs and put them into service. They have been doing a horse livery business for thirty years, and if their present enterprise proves successful they expect to add a motor truck livery service.

The Stewart Cab and Auto Company has introduced a taxicab service in Baltimore during the past month, using six Alco cabs. They operate a stand at the Renner Hotel. Mr. Stewart has been in the livery business in Baltimore for fifteen years, and says that if the taxicab business pays he will give up the horse livery business entirely.

J. W. Bearup has been operating a motor freight service between Manhattan and Tonopah, Nev., for some time. Mr. Bearup uses a Lambert truck, and makes a specialty of carrying perishable goods from the cold storage establishments in Tonopah to Manhattan, for which trip he requires four hours. At present one trip is being made every other day.

The Suburban Motor Transit Company, a recently incorporated concern of Perth Amboy, N. J., plan to operate a number of thirty passenger, 40 horse power motor omnibuses between Elizabeth and the Amboys. The buses will pass through Elizabeth, Linden, Rahway, Roosevelt, Chrome, Port Reading, Woodbridge and the Amboys. The company are incorporated under New Jersey laws, and plan to run ten buses at once on a half hourly schedule.

The Fairfield Dairy Company, Montclair, N. J., have recently placed in service a 1 ton Baker electric truck, equipped with forty-two cells of 9 M. V. Exide battery, and a 3½ horse power series motor, having an overload capacity of 300 per cent. The truck has a 92 inch wheel base standard tread and 34 inch wheels, with 3½ inch rubber tires. The front axle is an I section drop forging, and the rear axle is solid forging. Timken roller bearings are used in the road wheels, and imported ball bearings in the motor and countershaft.

# The New French Automobile Taxes.

The French Minister of Finance Cochery has submitted to the Budget Committee of the Chamber of Deputies a plan of taxation of automobiles, according to which not only is the tax on domestic automobiles to be considerably increased, but foreign motorists who tour in France will also be subjected to a tax if they stay in the country longer than ten days per year. As in the case of the present French automobile tax law, the new tax consists of two parts, as it were, a seat tax and a horse power tax. For domestic cars the seat tax, according to Mr. Cochery's plan, is to be as follows:

	Passen- gers.	More Than Two Passengers.
Vehicles of 10 Horse Power,	Francs	Francs.
Paris Cities of more than 40,000 inha		90
itants	40	75
Cities of 20,000-40,000 inhabitan	its 30	60
Cities of 10,000-20,000 inhabitan		50
itants	20	40
	Two	More

Vahislas Char ve Hann Banna	Passen- Than gers. Passe	ngers.
Vehicles Over 10 Horse Power.	Francs, Fr	ancs.
Paris	50	90
Other cities	40	-

The horse power tax is set down as

								1	rancs.
1-10	h.	p.,	per	horse	power.			-	5
11-20	h.	p.,	per	horse	power	addition	al		10
21-40	h.	p.,	per	horse	power	addition	al		15
41-60	h.	p.,	per	horse	power	addition	1a1		20
61-80	h.	D.,	per	horse	power	addition	nal.		25
80 h.	p.,	pe	r ho	rsc po	wer ad	ditional.			

At present French motorists pay the same seat tax, and in addition 5 francs per horse power, so the tax on cars up to 10 horse power would not be changed.

In applying the tax to foreigners who may be using their cars in France the seat tax would be 50 francs for a two passenger car and 90 francs for a four passenger car. This is for a period of 360 days, and touring motorists may get tax permits for one or more periods of thirty days.

Motor boats are to be subjected to the same tax as automobiles. The tax on taxicabs and livery cars is to be 80 francs for two passenger vehicles, 100 francs for three passenger vehicles, 125 francs for four passenger vehicles, 150 francs for five passenger vehicles, and 175 francs for six to eight passenger vehicles.

The Budget Committee has reduced the horse power tax as follows:

							Francs
1-12	h.	Pos	per	horse	power.		 . 5
13-24	h.	p.,	per	horse	power	additional.	 . 7
25-36	h.	p.,	per	horse	power	additional.	
37-60	h.	p.,	per	horse	power	additional.	 . 12
61 h.	p.,	per	r ho	rse po	wer add	litional	 . 15

On a four passenger, 24 horse power car the tax under the present law is  $5 \times 24 + 90 =$  210 francs.

Under the Cochery proposed law it would be  $90 + (5 \times 10) + (10 \times 10) + (4 \times 15) = 300$  francs.

Under the modified Cochery law the tax would be  $90 + (5 \times 12) + (7 \times 12) = 234$  francs.



#### Recent Decisions.

INTERPRETATION OF IOWA LAW.

The Iowa statute limiting speed, and requiring an automobile to signal in passing horses, was held not to relieve the driver of a car from exercising reasonable caution in passing a horse in the absence of a signal. To operate an automobile at a greater rate of speed in the city than is allowed by statute was held to be negligence. Whether a signal from an automobile horn is necessary in the exercise of ordinary care was held to be determined by the circumstances of each case. The question of negligence in passing a team in a city within a few feet of it without warning was held to be one for the jury. Where, after passing and frightening a team, the driver of an auto stopped some 30 feet ahead, thereby frightening it more and causing it to run away, it was held proper to leave it to the jury as to whether this stopping of the car was negligence. The driver of a vehicle was held not required to look out backward, and is entitled to rely on the use of ordinary care by those approaching from the rear. Unlawful speed of an automobile in passing a horse in the street, causing it to take fright and run away, was held not of itself to warrant a recovery.—Delfs vs. Dunshee. Iowa, 122 N. W., 236.

### GARAGE OWNER'S LIABILITY.

A garage contracted with the owner of an automobile not to allow it to be taken out at night without a written order. The chauffeur, at a rush hour, got by the watchman at the door, in the machine, and the machine was found on Long Island wrecked. It was held that a verdict for the plaintiff was sustained by the evidence, and the question of defendant's negligence was one for the jury.—Wilson vs. Wyckoff, Church & Partridge, 117 N. Y. Supp., 783. OWNER RESPONSIBLE WHEN LOANING MACHINE.

A chauffeur was allowed to use the machine for taking a pleasure trip with some boon companions. It was held that the owner of the automobile should be responsible for injuries caused by it through the negligence of anyone he permits to use it in the public streets.—Ingraham vs. Stockamore, 118 N. Y. Supp., 399.

# Enforcing Indianapolis Drivers' Registration Ordinance.

Orders have been issued to the police by the board of public safety at Indianapolis to arrest all automobile drivers who have not secured registration badges. During the last week upwards of twenty arrests have been made. The ordinance requires that every person driving a car, whether the owner of one or not, must register with the board and city controller: The registration fee, which need not be renewed, is \$1. For a third conviction for violating any automobile ordinances or laws, the registration is automatically revoked, and driving an automobile after the license is thus revoked will subject the driver to a fine of not less than \$50 to which must be added not less than fifteen days' imprisonment. About 2,000 drivers of the estimated 5,000 drivers in Indianapolis have registered.

#### Auto Appropriation Cut.

The city council of Indianapolis has declined to appropriate \$2,500 for the purchase of a new automobile patrol wagon for the police department, as requested by Mayor Bookwalter. The department has two automobile patrol wagons, and the council believed this to be sufficient. It also reduced a requested appropriation for the maintenance of the police machines during next year from \$3,600 to \$500.

#### Buffalo Garage Ordinance.

The ordinance committee of the Buffalo, N. Y., board of aldermen gave a publica hearing on October 3 on an ordinance introduced by Alderman Eberle relating to the establishment of garages in residence districts. The bill provides that it shall be unlawful to establish a public garage in any block in which two-thirds of the buildings are devoted to residence purposes without the written consent of the owners of the lands. The consent of the common council is also required. If the garage is so conducted as to be a public nuisance or injurious to health the permit may be revoked. The ordinance does not affect garages constructed and in use prior to October 1, 1909.

## Legal Notes.

Mayor Wm. S. Jordan, of Jacksonville, Fla., has vetoed the automobile tax ordinance recently passed by the council, after giving hearings to members of the council and private citizens who chose to call on him in the matter. The mayor considered the tax excessive.

A. C. Runkel's attempt to defeat the Milwaukee, Wis., council order prohibiting cars from standing at the curb on Grand avenue or Wisconsin street has come to naught. The prosecution changed the charged offense to disorderly conduct and Mr. Runkel was fined \$1 and costs.

Recorder McGovern, of Hoboken, N. J., last week fined the New York Taxicab Company \$10 for soliciting fares in Hoboken. Seventeen of the company's drivers were arrested in Hoboken early in the week for soliciting fares without a license in Hoboken. It is said to be likely that the case will be carried to a higher court.

The Wisconsin legislative committee on goods roads started on October 3 on a long tour of neighboring States to gain

ideas for framing bills to be presented to the special session of the Legislature in January. Michigan will be the first State visited. The committee attended the National Good Roads Convention at Cleveland in a body and obtained much valuable information to work on.

# Plans for Bay State Endurance Run.

The Bay State Automobile Association. of Boston, Mass., plans to hold another reliability run this fall. It is planned to have a two days' contest over a distance 450 miles in length. The route has not vet been definitely selected, but it has been suggested that two round trips should be made. both of them beginning and ending at Boston. The first route is from Boston to Quincy, Holbrook, Brockton, Bridgewater, Middleboro, New Bedford, Fall River, Taunton, Providence, Pawtucket, Woonsocket, Worcester, Pittsburg and back to Boston: and the second route leads from Boston through Lowell, Nashua, Manchester, Concord, Dover, Portsmouth, Newburyport, Haverhill, Lawrence, Salem, Lynn and back to Boston. A technical examination of the cars will follow the road trial, and will have an important influence on the awards.

### Another Race Planned on Indianapolis Speedway—Aviation Meet Off.

A race meet for November 1 has been announced by the Indianapolis Motor Speedway Company, to be held in Indianapolis, on the new brick course which is now being constructed. It is expected the work of paving the course will be completed within the next ten days or two weeks The speedway management has abandoned plans for an aviation meet. which was to have been held at the speedway October 14-15-16. This decision was reached after it was found Glenn H. Curtiss demanded \$12,000 for himself and a second driver, and flights were not guaranteed.

# Contract for Ohio Number Plates Let.

A contract has been awarded by the Ohio State Automobile Department for 30,000 sets of 1910 number plates to the Enterprise Enameling Company, of Bellaire, Ohio, at a saving of \$3,600 over the price paid in 1909. The plates will be of sheet metal covered with enamel. The background will be mahogany color and the figures and letters white.

In a letter of instruction sent out by State Registrar of Automobiles Fred H. Caley owners are informed that application blanks will be distributed in thirty days. Numbers for next year will be given out in the order of receipt of application. Number plates will be shipped out to arrive at their destination the last day of the year.

# GARAGE **ITEMS**

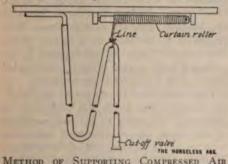


New Dayton, Ohio, Garage.

The Peckham Motor Car Company, of Dayton, Ohio, are building an up to date garage and salesroom, which when finished will be the home of the Peerless and Buick cars. It is expected that the building can be occupied by November 15 at the latest. The main building will be 70x100 feet, with three stories and basement. It will have a wing of two stories and basement. The basement will be entirely surrounded by light shafts, making it as light as the other floors. The basement of the main building will be used for storage, washing, etc. The ground floor of the main building will be used for transient storage; the next floor will be given over entirely to electrics, and will be so equipped that every repair on an electric can be made. The top floor of the main building will contain the repair and machine shop. The wing will be given over to showrooms, the basement being finished the same as the ground floor, except that the office will take up part of the room on the ground floor. The top floor of the wing will be devoted to bathrooms and supplies. There will be shower and tub baths provided for both ladies and gentlemen, and large dressing rooms for each, where the tired tourists can bathe and refresh themselves. The building is of reinforced concrete, absolutely fireproof.

A Garage Convenience.

Comparatively few large garages nowadays are without a power air pump for the purpose of supplying air for the inflation of tires. It is a rather vexing problem what disposition to make of the hose when not in use. In most cases a hook is provided on which it may be coiled when not in use. As often as not it is left on the floor after use, to be run over by machines and to be in-

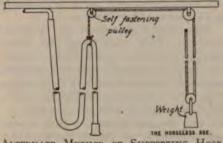


jured more or less by the action of oil or gasoline which is almost sure to drip on it. A rather simple but ingenious solution of the problem has been evolved at the Palace Garage in Hartford, Conn. The main air tube is led along the ceiling and the rubber tube connected at this point. An automatic curtain roller is secured in a frame and fastened to the ceiling near at hand. A light

line is wound on this roller and the end se-

HOSE.

cured to the rubber hose about a third of the way from the end. When not in use the tube is suspended out of the way. When wanted for use it is only necessary to take the end of the hose where it is wanted. Of course, a valve is provided near the "business end." When the person using the hose is through with it, all that is necessary is to give a slight jerk and let



ALTERNATE METHOD OF SUPPORTING HOSE.

go, when the hose will be removed out of

This arrangement might be simplified by using a couple of pulleys and a weight in place of the curtain roller. The one on the ceiling next the hose might be one of the self-fastening kind sometimes used on large window curtains.

Seattle Dealers to Organize.

Automobile dealers of Seattle, Wash., recently held a metting with the object of forming a trade organization, to be known as the Seattle Automobile Association. A temporary organization was perfected, Robert Guggenheim being elected temporary president and Clarence H. Jones temporary secretary. A committee on permanent organization was named, with James H. De Veuve as chairman, and another meeting for permanent organization is to be held at the Rainier Club on October 8. Among the objects of the organization are to stimulate interest in automobiling, to promote the construction of improved highways and to hold automobile shows, races and endurance contests.

# Columbus, Ohio, Club Planning Show.

At a meeting of the Columbus (Ohio) A. C. arrangements were made for a motor show, to be held at the Columbus Auditorium, some time in January or February, midway between the dates of the Cincinnati and Cleveland shows. A committee consisting of Perin B. Monypeny, O. H. Perry, Fred H. Caley, Herman Hoster and N. O. Aeby was named to arrange the details. The proposed two days' race meet in October was abandoned because of the fact that racing has been overdone in that section. It was decided to postpone "Old People's Day" until next year because of the lateness of the season, The club pledged itself to support legislation for the betterment of automobiling, and particularly the enactment of a State highway law having as its chief provision perpetual maintenance by the contractor.

# Annual Fuel and Oil Consumption in Automobiles-

The following figures may possess a certain interest to those who have a fondness for statistics. It is estimated that there are about 200,000 motor cars in operation in this country. Assuming that each of these cars is run 3,500 miles per annum, and that the average distance covered by the expenditure of a gallon of gasoline is 14 miles, a total of 50,000,000 gallons of fuel is consumed by these cars annually. At 15 cents per gallon this represents an expenditure for fuel of \$7,500,-

Assuming that the volume of lubricating oil used is 5 per cent, of the volume of gasoline consumed, 2,500,000 gallons of oil should be required for the lubrication of these cars, which, at 60 cents per gallon, would cost \$1,500,000 per annum. A cylindrical gasoline tank 100 feet in diameter and 850 feet in length would be required to hold the year's fuel supply, and an oil tank of the same diameter, but 42 feet long, to contain the lubricating oil supply.

### Space Allotments for Grand Central Palace Show.

When the applications for space for the coming Grand Central Palace Show, in New York, closed on September 29, it is stated that 110,000 square feet of floor space had been applied for, 5,000 square feet more than last year. Only 72,000 square feet is available, and the applications for space will, therefore, have to be cut considerably. The drawing for space will be held at the A. M. C. M. A. headquarters, 505 Fifth avenue, New York, on October 8. First the members of the A. M. C. M. A. will select their spaces, then the show committee will allot space to motor car makers who are not members of the A. M. C. M. A., after which accessory makers not members of the M. & A. M. will have spaces allotted to them.

Paige-Detroit Company Organized. The Paige-Detroit Motor Car Company

has been organized in Detroit, Mich., with a capital stock of \$100,000, and the following officers: Frederick O. Paige, president and general manager; Willis Buhl, vice president; Wm. B. Cady, secretary, and Gilbert W. Lee, treasurer. The company have taken a lease of the old Stearns laboratory building on Twenty-first street, and have placed orders for the necessary machinery. The first product of the company will consist of a three cylinder, two cycle runabout, to sell at \$800, and it is expected to begin the delivery of cars by December 1.

# Business Troubles.

An involuntary petition in bankruptcy has been filed against the International Automobile Company, of Chicago, by the Chicago Record-Herald Company, the Automobile Trade Directory and F. S. Howard. The liabilities amount to \$1,500.

# MINOR MENTION



The Waterloo Auto Parts Company is being organized in Waterloo, Ind.

Sears, Roebuck & Co., Chicago, Ill., are employing about fifty men in assembling their motor buggy.

The Seattle Automobile School has been established at 210 Broadway, Seattle, Wash., with day and night classes.

The Bissell Motor Company, of Toledo, Ohio, has filed notice of an increase in its capital stock from \$10,000 to \$200,000.

The Chase Motor Truck Company, of Syracuse, N. Y., have established a New York branch at 1876 Broadway in charge of F. B. Porter.

The De Schaum-Hornell Company have begun work on their factory in Hornell, N. Y. They will move their equipment from Buffalo to Hornell.

In the Long Island Stock Chassis Derby last week the winners in Classes I to 4 were equipped with Michelin tires, and the winner in Class 5 was equipped with Ajax tires.

D. W. Lawrence & Co., manufacturers of air pumps in Sterling, Ill., will shortly move to a building on West Third street, in that city, where certain improvements are now being made.

It is announced from Greensburg, Ind., that Harry Hamilton, of the Hamilton Garage Company, of that city, will open an automobile factory there, with the aid of local capitalists. It is planned to turn out a \$1,700 car.

W. R. Roberts, of El Reno, Okla, manager of the Pioneer Car Company of that city, plans to move the plant of the company to Wichita, Kan. The company manufacture both two passenger and four passenger cars

The Selden Motor Vehicle Company, Rochester, N. Y., have taken out a building permit for a two story brick factory building, 61x297½ feet, on Probert street, adjoining the New York Central tracks, at an estimated cost of \$43,000.

During the 10 mile race held at Mil-waukee, Wis., under the auspices of the Milwaukee A. A. on October 2, a Petrel car crashed into the fence and turned over, and both occupants were thrown out. Both were badly injured, but will recover.

The Ruggles Motor Company, which was recently organized in Springfield, Mass., to manufacture an improved two cycle motor, has leased the plant of the Massachusetts Ball and Machine Company at Gilmore and Cross streets, and will begin operations at an early date.

The new models of the F. B. Stearns Company, of Cleveland. Ohio, are all equipped with demountable rims, and an extra rim is furnished free of charge. In

case two sizes of tires are specified, as, for instance, 36x4 inch front and 36x4½ inch rear, two extra rims are furnished, one of each size.

The Timken Detroit Axle Company, Detroit, Mich., have purchased fifteen lots, covering about 1¾ acres, on the north side of Hickory avenue and the east side of Park avenue, for \$10,000. It is understood that the company will build an extension to its plant on these premises.

The Schacht Manufacturing Company, Cincinnati, Ohio, have bought the buildings at 2727-2735 Spring Grove avenue. The property comprises two well equipped buildings, 100x500 feet, both four stories high. The company are preparing to double their output of stock cars for 1910.

Thirty thousand square feet of floor space will be added to the plant of the Krox Automobile Company, Springfield, Mass. Another new building, giving 30,000 square feet more, will be erected in the spring, and a new power house is now being constructed to furnish 400 horse power in addition to the 250 horse power at present used.

The St. Louis Automobile Accessory Dealers held a meeting at the Blue Glass Hotel September 19. Among the topics discussed was that of credit, and Secretary Benoist explained the object of the credit bureau over which he presides. The Maxwell-Briscoe Motor Vehicle Company, of which M. W. Doyle is manager, was admitted to membership.

The Republic Motor Car Company is being organized at Hamilton, Ohio. At a stockholders' meeting, held on September 29, George H. Helvey was elected president, Chas. U. Carpenter vice president, Clarence Helvey secretary, Fred B. Rentschler treasurer, and G. F. Helvey factory manager and engineer. The company will manufacture automobiles.

A stock company is being formed in Carthage, Mo., for the manufacture of the McKiearnan automobile. P. E. Hannam will act as president of the company, which will locate in a factory building on Main street belonging to him. A committee headed by Mr. Hannam has been appointed to secure subscriptions for \$50,000 worth of stock from local investors.

Lakeside Forge and Wrench Company have acquired the plant of the Springfield Drop Forge Company, of Springfield, Mass., and began operations with a full force of men on September 27. Eugene Childs, who was formerly connected with the Trimont Manufacturing Company, of Roxbury, Mass., has been elected president and general manager of the Lakeside Company.

John Bohnet & Co., of Lansing, Mich., manufacturers of auto tops and other automobile accessories, have leased the upper two floors of the main building of the Clark & Co. carriage plant, which they will occupy November 1. The firm is reported to have just closed a contract to paint and trim 4,000 automobile bodies for an Indiana manufacturer, and also paints and

trims the bodies of the cars built in the Clark factory.

The K-W Ignition Company, of Cleveland, Ohio, inform us that they have again doubled their floor space and will manufacture their magnetos and coils on a much larger scale next season.

The assessment lists of Outagamie County, Wisconsin, show fifty-seven automobiles and no bicycles. There are said to be a great many bicycles in use, but the assessors apparently consider them not worth bothering about for purposes of taxation.

The Prest-O-Lite Company, of Indianapolis, Ind., will shortly establish a retail sales office in Minneapolis, as well as a plant for recharging their gas tanks. James A. Allison, a member of the firm, was in Minneapolis recently to secure suitable quarters.

The Pennsylvania State authorities have granted a charter to the Ewing Automobile Company, who recently removed from Geneva, Ohio, to Easton, Pa. The capital stock mentioned in the incorporation papers is \$10,000. The company will shortly start work on a plant on a 10 acre site along the Easton & Northern Railroad.

The Diamond Rubber Company have opened a branch at 46 Auburn avenue, Atlanta, Ga. The branch is temporarily in charge of W. F. Vodes, auditor of the company, but later on W. F. West, of Mobile, Ala., will become manager. It is stated that the company plan to cover the entire Southern territory from this branch.

The Studebaker Automobile Company is publishing the "log book" of Walter Hale, who toured Europe in a Studebaker-Garford car last summer. It contains an illustrated description of the trip, giving road maps, distances, taxes, passport fees and other information. Copies of the booklet will be furnished by the Studebaker Company free of charge on request.

The Leach Automobile Company, a New Jersey corporation with a capital stock of \$500,000, of which Charles Leach, of Lima, Ohio, is the principal, are negotiating with the business interests of Columbus, Ohio, regarding the location of a factory there. The company plan to manufacture a car equipped with a two cylinder, air cooled motor, and a patented transmission.

The twenty-four hour race on the Brighton Beach track, which was postponed on September 24, owing to the bad condition of the track, due to continued rains, has been set for October 15 and 16. The Bosch Magneto Company offer a prize of \$100 to the winning car, provided it is fitted with a Bosch magneto, and an additional \$50 if the record of 1,091 miles established by Robertson is broken in the race.

#### Club Notes.

The New Orleans A. C. is organizing what is to be known as the Louisiana Good Roads Convention, to be held at New Orleans November 20 and 21. In connection with the convention there will be a series of automobile races, including a six hour

event for different classes of cars, according to cylinder capacity.

The Florence Motor Club has been organized at Florence, Col. The officers of the club are; W. E. Mitchell, president; Dr. L. E. Rupert, vice president; E. F. Jack, secretary and treasurer.

An automobile club was organized at Crowley, La., on September 22, with twenty charter members, chiefly to work for the improvement of roads in the vicinity. The following officers were elected: Dr. R. B. Raney, president; L. L. Lyons, vice president, and Byron Thomson, secretary.

The Chicago Motor Club plans to hold another 1,000 mile reliability run October 12-15. The A. A. A. sanction has not yet been secured, but it is expected to be issued this week. The delay is said to be due to the fact that the Motor Club is endeavoring to get Chairman Hower, of the A. A. A. contest committee, to waive the requirements as to the penalty table. It may be found necessary to postpone the event owing to the short time left for organizing it.

### Garage Notes.

A branch of the Studebaker Motor Co, of Chicago will be established in Eau Claire, Wis.

S. K. Leedy, Harrisburg, Pa., will erect a brick garage at 2019 Green street at an estimated cost of \$3,000.

Chas. Crocker, San Francisco, Cal., will erect a one story garage on First street at an estimated cost of \$18,000.

F. A. Wagner, Southampton, N. Y., plans to erect a large fireproof garage adjacent to the

Commercial Hotel.

The Baldwin Plumbing Company, Falls, Ore., have leased the Elliot Building on West Main street, and will establish a garage,

Munson & Cleveland, of Sioux Falls, S. D., have sold their garage on Main avenue to the Inter-state Auto and Supply Company of Sioux City,

Charles R. Martin, Pasadena, Cal., has started a tire repair business at 46 West Colorado street, under the style of the Crown City Vulcanizing

H. G. and E. D. Van Lennep, Auburn, Cal., have irchased the C. M. Willis garage. The firm of Van Lennep Bros, will conduct a repair and sup-

A. Jacobs has bought the garage of the Cuyahoga Car Company on Euclid avenue near One Hundred and Fifth street, Cleveland, O., and will continue the business.

M. R. Vaughan, Burlington, Ia., has purchased business of the Burlington Auto and Supply Company, located on Front street in that city, Warren Beckwith,

The New York Auto and Machinery Company have secured a permit to build a salesroom and garage on Michigan avenue, St. Louis, Mo., on a

plot measuring 51x138 feet.
Robinson & Donaldson, Vincennes, Ind., have begun work on a 30x90 feet two story brick ga rage on First and Main streets. Both floors will be of concrete construction.

A new garage building is to be erected on the Sarah L, Coffin estate, corner of Van Ness avenue and McAllister street, San Francisco, Cal. The cost is estimated at \$14,000.

The firm of Gery & Wink, who control the Berwin Auto Company, Allentown, Pa., has been dissolved, Mr. Wink retiring, Mr. Gery will continue the business as in the past.

A petition in bankruptcy has been filed against the Pacific Garage and Livery Company, of San Francisco. The creditors are W. P. Fuller & Company, \$22.25; Bothin Real Estate Company, \$2,041.42, and Waterhouse & Lester Company,

The amount owed the real estate com-\$17.46. pany is for rent.

The Studebaker Automobile Company are reported to be planning to erect a new salesroom and garage building in Louisville, Ky., on the corner of Fourth avenue and York street

George C. Beckley, Jr., and C. H. Behn have opened a garage in Honolulu, T. H., at the corner of Alakea and Hotel streets. They will landle the Stoddard-Dayton and Packard cars.

H. F. Reed, Enosburg, Vt., is erecting a cement

block garage building 30x80 feet in the rear of his residence on North Main street. A space 30x20 feet will be utilized as a machine shop.

The name of the new firm which recently opened a garage in Ontario, Ore., was erroneously given in one of our late issues as the Clark-Pratt Auto Company. It is the J. S. Clark Auto Company.

Clarence R. Kessing, Portersville, Cal., has purchased the automobile business of the G. Bradrick Machine Works Company, and has removed the equipment to his garage on Oak street.

The Yakima Auto Company, North Yakima, Wash., have let the contract for a garage building on East Yakima avenue, the contract price being \$ .. ooo. Work on the building will begin at once,

S. M. Phillips, Sacramento, Cal., will erect a one story brick salesroom on M street, between Sixteenth and Seventeenth streets, at a cost of \$2,500. Mr. Phillips handles the Chalmers-Detroit

A two story addition is to be made to the garage Nutt & Keena at Belmont avenue and Pike street, Seattle, Wash. The addition will be fireproof and will serve for a repair shop and a storeroom.

A. F. Clause has established an electric garage in Youngstown, Ohio, at 110 West Kayen avenue, and will be local representative for Brock electric vehicles, Exide batteries and General Electric rec-

The Miles Automobile Company, Louisville, Ky. will shortly remove from Third avenue and Walnut street to a new garage now in course of construction on Third avenue between Chestnut street and Broadway.

Neely & Ensor, Baltimore, Md., who recently purchased the former car barn property at Mt. Royal avenue and McMechen street for \$40,000, will convert the building into a garage by making extensive alterations.

Chas. E. Emrick, of West Milton, O., bought a property on West Main street which he will use as a garage. A galvanized iron addition, 30x110 feet, will be erected at once, Mr. Emrick will handle the Rambler.

U. G. Myers and Marshall Macdonnell, Ottumwa, Ia., have organized the Iowa Auto Sales Company, and bought the garage on Green and Second streets formerly conducted by N. A. Stull. The new firm will handle the Ford car.

A new garage has been opened at Ripon, Wis., near Green Lake, by H. S. Hart, of Milwaukee, and E. A. Butzke, a wagon and carriage manufacturer of Ripon. The three-story Jackson building has been leased and will be devoted entirely the business.

A garage, livery and repair shop will be opened J. H. Morgan at Rhinelander, Wis., in the ing, Mr. Morgan has leased the Barnes building and if the venture is a success a brick structure will be erected later. His son, Gordon Morgan, will be manager.

W. A. Williams and O. D. Morgan have purchased the garage business of the Reliance Machine Company, Warren O., whose establishment is located on East Market street. They expect to erect a new brick building on Market street, just north of the bridge.

The Hudson Automobile Company has been organized at Paterson, N. J., and about October 15 will occupy a new garage building which is being erected on upper Market street. The new company will handle the Hudson car. Jack Miller

will be manager of the company.

J. P. Matthews and R. L. Logan will open a show room in the Murphy Building in Atlanta, Ga., for the Pennsylvania auto motor, as the Pennsylvania sales agency. Temporary quarters have been secured at 223 Century Building until the Murphy Building is completed.

The Shelby Automobile Co. has been organized

at Bristol, Va., with a capital stock of \$10,000.

E. K. Parker and M. E. Rodehaver, Santa Barbara, Cal., have bought the Santa Barbara Garage at De la Geurra and Anacapa streets from Charlotte A. Izard, executrix of the estate of Thomas P. Izard.

The Hathaway-Stimson Company has been or-ganized in Minneapolis, Minn., to handle the Hupmobile, Detroit Electric and one other line. B. Stimson, formerly agent for the Maxwell car at St. Joseph, Minn., will have charge of the garage. The company will build an electric garage to accommodate from 50 to 60 cars.

The Cadillac Automobile Company of Indiana, which has had the Indiana agency for the Cadillac, with headquarters at Indianapolis, for several years, has been succeeded by the Peck Motor Car Company. The new company has leased a building at 322-324 North Delaware street, to which it will move from its present quarters at 25 East Ohio street soon.

Chas. f. Coyle, a building contractor of New, Haven, Conn., is erecting a one story brick ga-rage in Columbus avenue near Meadow street, at a cost of \$3,000, for a New York automobile firm not named. On the same property a \$25,000 garage is to be erected. John J. Murphy, of New Haven, will have charge of the garage, for which plans are now being drawn.

The Blue Ribbon Garage, 112 East Seventy-fifth street, New York city, which was formerly owned by Elwood Banfield, has been purchased by the Lenox Garage Company. The building has been thoroughly renovated, an electric elevator has been installed, and air compressor has been added to the equipment. The new company will handle a full line of supplies.

Frank E. Harris, Lowell, Mass., has bought the property of the Lowell Automobile Company, lo-cated on Appleton street, Mr. Harris is proprietor of the Lowell Taxicab Company, and conducts another garage on Arch street. He will manage the Appleton street garage personally, and will handle the Buick, Oldsmobile and Oakland cars in Lowell and Nashua and suburbs.

The California Electric Garage Company has recently been incorporated under California laws, to conduct garages for electric vehicles and agencies for vehicles and batteries in Pasadena and Los Angeles. The Los Angeles establishment is located at 1204-06 South Olive street. pany has the agency for southern California for Detroit electric vehicles and Philadelphia storage

Leases for ninety-nine years have been taken on property at Illinois and Vermont streets in Indianapolis by the Maxwell-Briscoe Motor Co. and plans are being made for a three story, brick salesroom in that city. The building, construction of which will start immediately, will cost \$60,000. The company has temporary headquar-ters in Indianapolis in East Market street, being represented by J. W. Hayden,

The High Point Auto Company have been organized at Atlanta, Ga., and have secured the building at 98-100 South Forsyth street, formerly occupied by an instalment company. The members of the firm are R. C. Edwards, of Hapeville, who will be manager, and W. J. Dabney. The company will represent the Coles Motor Car Company, of Indianapolis, Ind., in North and South Carolina, Alabama and Georgia.

Arthur W. Davis, proprietor of the Cortland Automobile Company, Cortland, N. Y., has purchased the old Rink property in South Main street, and will at once erect a modern concrete garage. The building will be 50x100 feet, two stories high in front and one story in the rear. The ground floor will contain a garage, machine shop, show room, office and oil storage room.

The firm of Rykert & Gould, garage owners of Sycamore, III., has been dissolved, and Mr. Rykert will continue the business alone. Mr. Gould has leased a property at State and Main streets, on which he will immediately erect a one story garage building. He will specialize on repairs, and will also handle new and second hand

Ralph Hayden is building a concrete block addition to the garage in Church street, Lowell,

A garage building is being crected for the St. Louis Taxicab Co. at Twelfth and Chestnut streets, St. Louis, Mo.

A garage business will be conducted in the northern part of Kellogg storage rooms on Crane street, Clifton Springs, N. Y.

The Stanley Co., Pittsfield, Mass., have let a contract for a garage building, hospital and firemen's headquarters, to cost \$35,000.

A new garage building is to be erected in Portsmouth, N. H., on High and Fleet streets. The building will be a two story structure.

A number of automobile owners of Jacksonville, Ill., are forming a company to operate a garage. Incorporation papers have already been filed.

The six story building and livery stable at 2 West Ninetieth street, New York city, is to converted into a garage for the Carnegie-Hill Motor Co.

Joseph Speidel, Jr., Wheeling, W. Va., who the agency for the Pierce, Chalmers-Detroit and Hudson cars, is said to be planning to erect a garage building near Altenheim.

A building on Madison avenue and South Fourth street, Memphis, Tenn., originally erected for theatrical purposes, has been taken over by a firm of contractors, and is to be reconstructed as a garage.

The Dillon Auto Co., Davenport, Ia., whose inorporation we mentioned in a recent issue, will handle the Hupmobile, and has secured headquarters at P. C. Petersen's Garage at Fifth and Main streets.

The Boston Electric Garage Co., of which N. Rommelfanger is president, have opened a garage for electric vehicles exclusively at 321 and 323 Columbus avenue, in a new four story and basement brick building. The company will handle the Detroit electric.

Henry R. Hoopes, who represents the Crawford car in Philadelphia, has entered the garage business by taking over the Powell garage at 1404-6 Ridge avenue, which he will conduct independently of his agency business. Frank H. Ramsey will manage the garage.

The recently organized Haynes Automobile Co., of St. Louis, Mo., have secured a salesroom at 419 North Euclid avenue, the building now occupled by the Lindsay Motor Car Co. In addition to the Haynes line the company are figuring on the representation for a low priced roadster.

The addition to the F. E. Avery Garage on Franklin avenue, Columbus, Ohio, has been completed, and is now partially occupied. contain the offices, repair shop and showroom. The second story of the old part will be torn down and reconstructed, so as to be fireproof.

The brick garage of W. H. Heinzerlinger in Seattle, Wash., was destroyed by fire on September 23, and twenty automobiles were burned. The total loss is estimated at \$80,000. Little insurance was carried. The fire is said to have been caused by dropping a lighted match near a leaking gaso-

Oscar Anderson, Moline, Ill., will open a garage at First street and Third avenue in the near future, and will secure the agency for some line of cars. His brother conducts a machine shop on the second floor of the same building, where any repairs to cars stored in the garage may be made.

C. Rov Clough, manager of the Columbus branch of the Charles Schiear Motor Car Company, has placed the following sub-agencies in southern Ohio for the 1910 Hupmobile: Newark, G. D. Heisy; Springfield, L. E. Bauer; Greenville, Swope Music Co.; Dayton, A. H. Pearson at Central Garage.

## New Incorporations.

The Mosier Auto Co., Indianapolis, Ind.-Capital stock, \$6,000.

\*Mhite Garage, San Diego, Cal.-Capital stock,

Incorporators, F. C. Barnum, W. H. \$20,000. West, Earl B. Pfeifer and H. J. Gottestburen.

Santa Paula Garage and Machine Co., Santa Paula, Cal.—Capital stock, \$20,000. Incorporators, W. D. Schafer, W. M. Stein, F. E. Davis, A. C. Hardison, C. C. Teague and Urban Underwood.

Buick Auto and Garage Co., Portland, Me.— Capital stock, \$100,000. Incorporators, E. M. Leavitt and others.

Automobile Transportation Association, Chicago, Ill.-Incorporators, O. H. Fay, John D. Haartz and A. B. McCoid.

Jackson Motor Co., Minneapolis, Minn.-Capital stock, \$15,000. Incorporators, F. Darling, L. S. Darling and D. E. Morror.

Aroostook Auto Co., Fort Fairfield, Me.-Capital stock, \$25,000. Incorporators, Leigh M. Goodrich and Geo. H. Churchill.

Imperial Motor Car Co., Houston, Tex .ital stock, \$10,000. Incorporators, J. Lane, J. H. Bright and Geo. W. Collier.

Mono Motor Car Co., Elizabeth, N. J.-Capital stock, \$300,000. Incorporators, W. H. Wood, H. T. Eaton and Charles Roberts.

Dillon Auto Company, Davenport, Ia.-Capital stock, \$3,000. Incorporators, E. J. Dillon, Wm. M. Dillon and John E. Purcell.

Texas Motor Car Co., San Antonio, Tex.-Capital stock, \$10,000. Incorporators, F. A. Hornaday, A. J. Bell, H. T. Hansford.

The Vale Automobile Co., Beloit, Wis.-Capital stock, \$10,000. Incorporators Harry Vale, J. W. Menhall and T. D. Woolsey.

Roberts Motor Car Co., Dallas, Tex.—Capital stock, \$10,000. Incorporators, M. C. Roberts, B. M. Lindsley and Walter Lechner.

Central Automobile Co., Johnstown, Pa.-Capital stock, \$50,000. Incorporators, W. W. Grove, Ed. A. Vivis and James McCloskey.

Spoonheim-Riddell Motor Sales Co., Northwood. Dak .- Capital stock, \$10,000. Incorporators, A. C. Riddell and E. K. Spoonheim.

The Fidelity Motor Car Works, Sycamore, Ill. -Capital stock, \$25,000. Incorporators, E. C. Binkley, Byron J. Snow and J. W. Waters.

The Central Texas Auto Co., Taylor, Tex.—Capital stock, \$10,000. Incorporators, Howard Bland, Dan Murphy, O. R. Frame and A. A. Zizinia.

The East St. Louis Automobile Company, East St. Louis, Mo.—Capital stock, \$2,500. Incorporators, M. L. Harris, Carl O. Houseman and J. R. McMurdo.

Cleveland Speedway Co., Cleveland, Ohio .-Capital stock, \$1,000. Incorporators, Herbert Mathews, E. G. Gilbert, F. W. Force and Margaret M. Graf.

Shelby Automobile Co., Bristol, Tenn.—Capital stock, \$10,000. Incorporators, H. W. Reynolds, A. D. Reynolds, Jr.; J. Hoge Reynolds, C. J. St. John and H. H. Shelton.

Cleremore Manufacturing Co., Chicago, Ill. Capital stock, \$15,000. Incorporators, C. E. Carpenter, S. Largrou and C. Doelittle. (To manufacture and sell automobile parts, etc.)

#### Trade Personals.

The name of Capt. William Mitchell Lewis, president of the Mitchell Motor Car Co., of Racine, Wis., is being mentioned in connection with the Republican nomination for Governor of Wisconsin.

Chas. A. Francis, of South Bend, Ind., has joined the forces of the Packard Motor Car Co., of Detroit, Mich. Mr. Francis was formerly superintendent of the carriage department of the Studebaker Brothers Manufacturing Co.

Milton A. Kent, assistant cashier of the Merchants and Savings Bank, of Kenosha, Wis., resigned on October 1 to become general manager of the Kent Motor Car Co., a new agency corpo ration at Kenosha. Its territory includes several Western and Northwestern States,

D. E. MacCarthy has sold his interest in the General Manufacturing Co., of Elkhart, Ind., to A. T. Welles, treasurer of the company, who purchased an interest in it about three months ago. Mr. MacCarthy will sever his relations with the company on November 1. The company manufactures automobile parts, and employs at present about eighty men.

John E. Kay has accepted the position of assistant manager of the Maxwell-Briscoe Co., Atlanta, Ga. Mr. Kay was formerly connected with the Maxwell factory at Tarrytown, N. Y.

A. E. Wheeler, formerly connected with the sales department of the C. E. Mills Oil Co., of Syracuse, has been appointed assistant to s manager Geo. E. Messer of the H. H. Franklin Manufacturing Co.

George L. Bixby, who held the position of assistant superintendent with the Pope Motor Car Co. of Indianapolis, which is now known as the Waverley Manufacturing Co., has entered the service of the Overland Automobile Co. as secretary to Will H. Brown, manager of the Indianapolis factories of the Overland Automobile Co.

#### New Agencies.

Ballinger, Tex.—R. T. Jones, Moon. Bartlett, Tex.—E. H. Wilson, Moon. Springfield, Ill .-- H. V. Hickox, Moon, Washington, Mo.-C. Krumsick, Moon Nebraska City, Neb .- R. Duff & Co., Moon. Washington, D. C .- Motor Sales Co., Moon. Adrian, Minn.-Prideaux Brothers, Overland. Alexandria, Minn.-Slade Brothers, Imperial. Minneapolis, Minn.-F. W. Segerstrom, Moon. Hartford, Conn.-Brown, Thomson & Co.,

Lozier.

New York City, N. Y .- Cloud-Marts Company. Selden

Oklahoma City, Okla.-W. C. Ballard & Co., Moon.

Indianapolis, Ind.-Buick Motor Car Co., Oldsmobile.

San Francisco, Cal.-Cuyler Lee. Cadillac and Packard.

Burlington, Vt.-Hill Storage and Implement Co., Moon.

Aurora, Neb. (for Hamilton County) .- J. H. Donner, Moon, Northwood, N. Dak.-Spoonheim-Riddell Motor

Sales Co., Empire. Des Moines, Ia. (for Polk, Dallas and Boone

counties).-J. Wills, Moon. Edwardsville, Ill. (and east end of Madison County) .- D. J. Keller, Moon.

Los Angeles, Cal. (for southern California) .-Stearns Automobile Co., Moon.

Milwaukee. Wis.-The Wordingham Auto Supply Co., 803 Grand avenue, Moline.

Holyrood, Kan. (for Ellsworth, Russell, Rushand Ellis counties).—J. L. Baker, Moon.

Memphis, Tenn. (for western Tennessee and northern Mississippi).--J. H. Parphrey, Moon.

### Trade Literature Received.

Joseph Dixon Crucible Co., Jersey City, N. J .-Booklet on Dixon's foundry facings. Chadwick Engineering Works, Pottstown, Pa .-

Catalogue of the Chadwick Six for 1910. Bosch Magneto Co., New York city.-"Palmer's

Views of New York, Past and Present." B. C. K. Motor Car Co., York, Pa.—Folder containing specifications of the "Kline Kar."

H. H. Franklin Manufacturing Co., Syracuse, N. Y .- Booklet concerning Franklin automobiles

for 1010. Mitchell Motor Car Co., Racine, Wis .- Folder giving advance information regarding Mitchell 1010 models.

Frank Mossberg Co., Attleboro, Mass.-Folder containing full sized engravings of wrenches made by the company.

The Automobile School, 2169 East Ninth street, Cleveland, Ohio .- Booklet outlining the courses of instruction of the school.

Great Western Automobile Co., Peru, Folder entitled "For Your Profit and Informa-tion," relating to the new Great Western "Thirty."

Taylor Instrument Companies, Hohmann & Maurer Division, Rochester, N. Y .- Booklet on "Tycos" pyrometry, as applied to hardening, tempering and annealing furnaces, to case hardening and reheating muffles and salt baths.

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# Simplification by Combination of Parts and Multiplication of Functions.

By ALBERT L. CLOUGH.

In one sense of the word the motor car of today is essentially the same as that of ten years ago. There are the motor, the change speed gear, the transmission and the running and steering gears. The motor still requires to be cooled, lubricated and ignited, and it and the rest of the mechanism require to be controlled and oiled.

While these elements and their functions remain in a broad way identical, it is interesting to observe several directions in which simplification has progressed, and is progressing, despite the fact that the adoption of multi-cylinder motors and a greater number of speed changes have resulted in that kind of complication which is brought about by the multiplication of similar parts.

This simplification, which is such a desideratum from the standpoint of the user, as well as that of the manufacturer, has mainly been of the two following types:

(1) That in which several previously separate elements, either similar or dissimilar, are consolidated into a single structure, involving a lessening of weight, improved strength and neatness of appearance, the elimination of fastening devices and better facility in assembling, and

(2) That in which a single element, intended primarily to perform a specific function, is made to perform or assist in performing other functions, by attachments thereto or by means of a special conformation of the part.

It may be rather interesting to note some examples illustrative of these lines of simplification, and the following are a few which come under the first head.

BLOCK CYLINDERS.

Casting cylinders en bloc is an obvious example of the combination of two, three or four similar parts in one structure, resulting in a simplification of the machinery and assembling processes at the expense of some added complication in the pattern making and founding. Reduction of weight, higher rigidity, a reduction in the number of fastening devices, and cleanness in design, are secured thereby.

The incorporation of the intake manifold in the "bloc" is another correlative example, resulting in reduced external complication, a higher degree of engine accessibility, greater facility in cleaning the motor, and reduced fastening devices with their liability of leakage.

Similarly the provision of passages within the bloc, which take the place of water piping, tends toward simplicity and offers similar advantages, including convenience in assembling and dismounting the motor, external simplification and the freedom from leaks which comes from the reduction of joints.

COMBINED CYLINDER AND CRANK CASE.

In this same connection may be mentioned the consolidation of the cylinders and the upper half of the crank case in a single casting, which is beginning to be practiced in en bloc construction. A whole set of fastenings is thus eliminated, and the movement is in the direction of simplification. Related to this practice is that of making engine and auxiliary gear and shaft housings integral with the crank case casting, and of combining therewith magneto, pump and oiler brackets or beds.

CRANK CASE AND GEAR CASE UNITS.

A combination between the crank case and the case or bed forming the housing for the gear set and clutch is another example of consolidation, which simplifies the assembling and aligning processes, saves weight, increases rigidity, and conduces to a clean design. All unit power plant designs exemplify this practice of combination of the parts more or less, but in some the consolidation is less intimate than in others, merely consisting in bolting together the two otherwise separate parts. In most of these unit power plants separate control pedal brackets are dispensed with, the pedals operating upon brackets integral with the gear case, which is conveniently located so as to permit this.

CORED OIL CHANNELS.

Another manner in which crank case design can be made to embody another set of elements is by the casting within its walls of the oil distributing passages and the support for the pump which moves the lubricant, together with its driving mechanism. Simplification results from the elimination of external piping and fittings, and the obviation of a pump mounted as a separate

In a number of designs the clutch housing and the gear box are consolidated, leading to a reduction of the number of parts to be assembled upon the chassis, and probably some weight reduction.

REAR AXLE GEAR BOX.

The familiar rear axle mounted gear box is an example of the combination in what

is, from the standpoint of the assembler and the user, a simplified form of the rear axle housing, the change speed gear and the differential housings. In some planetary designs the clutches have also been housed in the same unit. Combination of parts may be more or less intimate in accordance with the details of the design, but the simplification is mainly noticeable in assembling, although the appearance of simplification is very marked. Speaking of gears, the cutting of a pinion integral with its shaft is a worthy example of consolidation in the direction of simplification. Keys and keyways are eliminated, and greater reliability is secured. The cutting of cams integral with their shaft is closely analogous to this.

#### ONE PART AXLES.

The running gear also furnishes examples of the practice of making two or more things "in one," in the interest of simplification, and even more of reliability. A single forging now comprises the front axle, the spring seats and the steering forks. Formerly these latter parts were pinned and brazed to the axle tube. Rear axle housing, driving gear case and rear spring seats are now formed of a single steel stamping, the pinning and brazing of tubes to their fittings, and the bolted fastening to the central housing portion, as formerly practiced, being eliminated.

Examples are even to be found about the frame. Spring horns, which were formerly riveted to the side member ends, are now formed integral therewith, and the front spring horns are even fitted with the head-light bracket sockets.

The radiator, which was formerly a set of finned pipes, drawing from an entirely separate tank located under the hood, now combines, as a single structure, the heat dissipating surfaces and the tank holding the reserve water supply.

Even the ignition wiring shows the tendency toward consolidation and external simplification. For example, the solid bar of insulating material into which are molded all the conductors which pass along the engine. By the combination of the turning and distributing elements in a single device, the distributor, all but one of the ignition coils otherwise needed are banished from the dash.

Everywhere is evidenced the endeavor of the automobile engineer to consolidate, to make the whole a combination of as few distinct structures as possible. The development of the low priced car has been mainly achieved by attention to this principle, reduction in weight, lessened cost of machining, and an enormous decrease in the cost of assembling having been attained in this manner. Combination of parts gives the user a car which is light, which has few fastening devices to work loose, which is very simple in appearance, readily kept clean, and which is decidedly better qualified to inspire confidence.

Plenty of examples of the use of a single element to perform more than one function are to be found, and it is the obvious aim of the designer to carry this principle as far as it can profitably be extended.

#### CONTINUOUS WEB ENGINE SUPPORTS.

We see the engine supports made in the shape of a continuous web, which forms a pan to protect the motor from road dirt. The separate sod pan under the motor is thus eliminated, and its weight and cost are saved. Instead of employing a separate oil reservoir, mounted upon the dash or under the hood, the lower portion of the crank case is so used, or one of the supporting arms of the motor is converted into an oil tank. Channels in the connecting rods and crank shaft serve as oil distributing leads, and separate ones are not required.

#### FAN FLYWHEELS.

The flywheel, in addition to its familiar extra functions as a clutch member and an index for ignition and valve setting, is cast with fanlike spokes, or has fan or blower blades attached to it, and takes the place of the radiator fan. eliminating it and its driving devices. The designer may go even further and fit the flywheel with permanent magnets, which, revolving in proximity to stationary coils. generate the magneto ignition current, thus obviating the necessity of a separate magneto, its driving shaft and gears, and the housings which protect them.

Moreover, the flywheel may be used as an oil pump to lift the lubricant from the wheel pit to a higher level, from which it is distributed through channels to the various bearing surfaces. The use of the connecting rod tips as oil distributors is a familiar example of a double function. Such applications of moving parts to perform the functions of the oil pump and distributor tend toward the elimination of the separate oil pump and its driving mechanism.

In the valve mechanism one push rod may be used to operate two valves, and a reduction of parts may thus be secured. The flexible cover plates of the water jackets may be made not only to serve their primary purpose of confining the circulating water, but also as safety devices guarding against the breakage of the cylinder casting, in case freezing occurs, and the flexible coupling driving the pump may also act as a safety device of the "weak link type," to prevent damage due to foreign substances in the circulating system.

#### TORQUE RESISTING SHAFT HOUSINGS.

The casing of the drive shaft is made at not only as a housing but as a torque

resisting member and as a distance rod, and thus a complicated system of rods, swivels and links is done away with, and their expense and weight are obviated.

Two independent brakes are made to operate side by side, or internally or externally upon the same rear wheel drums, and the same pedal which disengages the clutch is made to apply the service brake.

In the gear box one of the direct drive clutch members is the middle speed pinion, and the other member is formed by the internal teeth of the constantly meshed gear of the clutch shaft.

The distance rod is used as a functional part of the shock absorber in a well known runabout

Such examples illustrate very nicely the "boiling down" process which automobile design is subjected to in order that the number of essential parts may be decreased as nearly as possible to the "irreducible minimum." It is only when this is accomplished that a mechanism is producible which shall possess no superfluous weight, which shall be cheap to manufacture, cheap to maintain, and free from the evils which arise from complexity. Simplicity, coupled with good material, well placed as regards the stresses which it has to bear, in a design such that all parts are harmoniously related to the production of certain results, represents an ideal toward which the designer may well strive with all his energy.

#### Plan of Organization of a Taxicab Company.

BY EDWARD WELLS.

In this article the whole organization is shown as divided into three separate departments, executive, managerial and operative, while the subdivisions of each are clearly designated.

#### EXECUTIVE DIVISION.

First in authority comes the executive division, which is made up of the usual corporation officials, whose relative positions are as follows: President and board of directors, vice president, treasurer and secretary. The duties of the executive officials are clearly indicated in the bylaws of the company, and they will, of course, be governed by the laws of the State relating to corporations, and the responsibilities and duties of officials connected therewith in the handling of the affairs of the company.

#### MANAGERIAL DIVISION.

General Manager.—First in authority in the managerial division will be the general manager, and he will have full control over the entire company as to management and operation, excepting that problems of vital importance and affecting the whole policy or welfare of the company will be referred to the board of directors for approval before taking effect. The general manager, who will also be the vice president, will countersign all checks and, in general, outline the business policies of the corporation. No expenditures will be made without his approval, excepting as hereinafter outlined, and all important contracts must also be submitted for his approval and signature.

Assistant General Manager.—Next in authority will come the assistant general manager, who will be in active control of the managerial division and have a general oversight of the operative division. He will be advised or directed in matters of great importance by the general manager, and, in the absence of the general manager, will confer with the board of directors in such matters. While the assistant general manager will not handle the actual cash of the company (which will at all times be under the direct control of the treasurer), he will nevertheless have general charge of

various papers and documents relating to expenditures or receipts, and no requisitions for supplies or other orders calling for disbursements or payments of any sort will be valid except when O. K.'d by him or by the general manager, as previously specified.

The assistant general manager will apportion the work and daily duties among the various other members of the business department, and will have full charge of the same. He will design, change or modify systems pertaining to the business according to his discretion. He will also certify to the correctness of all payrolls and O. K. all purchase requisitions (as heretofore mentioned), and approve all reports of receipts when the same are audited and found to be correct. He will also inspect all other reports from every department of the company and approve the same if found to be correct, and in accordance with the requisites of the business. Other duties of the assistant general manager will develop as the business progresses, and he will, of course, fulfill these in accordance with his judgment and discretion.

At all times the managerial division will have jurisdiction over the operative division, but, unless some serious contingency should arise, it is understood that the authority of the superintendent will not be superseded, and in any and all cases where changes are thought advisable in the operative division the superintendent must be duly notified and such changes made through him.

Assistant Treasurer.—The assistant treasurer will be in charge (under the treasurer) of the direct collection and disbursement of the company's funds in all departments and will sign all checks and have charge of the bank accounts for all operative and current uses. All checks, however, must be countersigned by the vice president and general manager, as hereinbefore stated, or in his absence by whoever the board of directors may designate. The actual collections of cash will be made by the paymaster and collector, who will immediately

turn them over to the assistant treasurer, obtaining a receipt from him for the same, and he will also apportion and disburse all salaries of employees of the operative division according to the O. K.'d payrolls which will be furnished him by the management; and for this purpose he will receive the correct amount of cash from the assistant treasurer, giving him a receipt for the same, which receipt will be returned to the paymaster upon his delivery to the assistant treasurer of the signed payrolls or other salary receipts covering the disbursement of the amount previously delivered to him.

The assistant treasurer will issue "petty cash" (so called) to the cashier or bookkeeper, who will expend the same for office incidental uses, such as for postage stamps. express charges, telegrams, stationery items of not more than \$1 in each case (larger expenditures must be made by requisition only), and for such other incidental uses as may be directed by the assistant general manager. In all cases the assistant general manager must O. K. every petty cash voucher, and the account must be balanced, and if found to be correct approved by the treasurer or assistant treasurer when amounting to not more than \$25. The assistant treasurer will have authority over the paymaster and collector in matters relating to the handling of cash, but in all other respects he will be under the managerial division only.

The treasurer and the assistant treasurer will at all times have access to the cash books and payrolls of the company, as well as to any documents or other papers pertaining to the receipt or disbursement of the company's funds.

The assistant treasurer will also make up all payrolls in accordance with the detail furnished him by the time clerk, which must be approved by the management before becoming authoritative. He will also act as auditor of all accounts.

The collection of "change accounts" with the various stands at which cars of the company are stationed will also be included in the duties of the assistant treasurer, and to facilitate such duties he will have a certain amount of authority over the bookkeeper, such as causing statements, etc., to be sent. This will also be so in the matter of monthly or other accounts with individuals who lease or secure cars upon the rental basis. It will thus be seen that the statistical or bookkeeping department is under the managerial authority in all respects, excepting such as relate directly to the handling of cash or the collection of ecounts, which will be authorized by the treasurer or his assistant.

Paymaster and Collector.—The paymaster and collector will receive the collections of an "starters," making a daily trip to each stand, where a starter is stationed for this purpose. He will receive all moneys collected from stations where there are no starters from the chief starter, who in turn will collect the same from the chauffeurs

assigned to such stations. The starters will be under the collection agent only in regard to the handling of funds received, and in all other matters will be under the authority of the superintendent or the managerial division through the superintendent.

All salaries, except those of the employees of the operative division (who will be paid by the cash envelope method), will be paid directly by check by the treasurer or his assistant. The assistant treasurer, paymaster and collector and all starters will be required to furnish surety bonds.

Advertising Manager.—The advertising manager will be under the authority of the assistant general manager, and will be in full charge of all matters relating to advertising. In case the advertising is placed in the hands of an outside advertising agency (which may be done at the option of the board of directors of the management) this branch of the business will nevertheless remain under the direct supervision of the assistant general manager, who will delegate stenographers or other office employees to assist the advertising manager to such an extent as in his judgment may be sound necessary.

Chief Clerk.-The chief clerk will have charge of the office employees (with the exception of the bookkeeper) under the assistant general manager, and his duties will include an oversight of stenographic work. tabulation of reports and the general details pertaining to the statistical work of the company. He will open such mail as may be designated by the assistant general manager, and in the absence of the latter from the office will assume such of his duties as may be designated by the general manager. The chief clerk, however, will have no authority at any time over the operative division, and in the absence of the assistant general manager only the general manager will have authority over the head of the operative division.

Minor Office Assistants.—The duties of stenographers, filing clerks and telephone

operators will be according to custom and to the requirements of their several positions as relating to this line of business. They will all be under the control of the assistant general manager and the immediate direction of the chief clerk.

Bookkeeper.—The bookkeeper will attend to the usual duties of such, and will be under the authority of the assistant general manager in all matters excepting those hereinbefore specified as coming under the authority of the treasurer or his assistant.

In the event of its being found necessary to create other offices or to engage employees not specified in the foregoing the respective positions and duties of such will be determined by the board of directors, in the event of the positions being those of authority, or by the assistant general manager, in the case of minor employees or office assistants.

#### OPERATIVE DIVISION.

Superintendent.—The superintendent and chief engineer will have control of the entire operative division, excepting that he will be subject to a certain amount of authority of the managerial division, as previously specified. He will issue general directions for the guidance of the assistant superintendent, inspectors, foremen, master mechanic, starters, head tireman, time clerk and all other employees of the operative division.

All requisitions for gasoline, oil or other supplies or materials of any nature whatever, necessary for use in the operative division, will be made by the superintendent, but must be O. K.'d by the assistant general manager and approved by the general manager, as previously stated.

The superintendent will also see that all fire regulations and other ordinances relative to personal or property protection are strictly enforced, and will conduct such examinations, tests or drills as may be necessary for safeguarding the same.

All operative department pay rolls or reports of an important nature must be in-

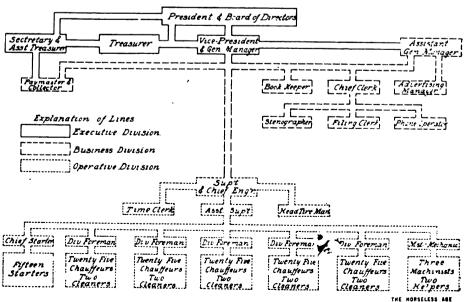


DIAGRAM OF ORGANIZATION.

spected by the superintendent before being submitted to the managerial department.

Assistant Superintendent.—The assistant superintendent will act as a general assistant to his chief, aiding him in all matters relative to the immediate handling of the various minor authorities of this division, and will have direction of the daily routine work at the garage. Among his principal duties will be the dispatching of the cars upon the various "shifts," which will be done according to the running schedule furnished by the management.

He will also have charge of the issuance of supplies to the chauffeurs and garage men, and will act as custodian of the gasoline, oil, spark plugs and other valuable supplies necessary to this department. He will be required to give an accurate accounting for all supplies so dispensed, and will use the strictest economy regarding the same. The superintendent will, of course, have a general oversight of the supplies utilized as well.

Division Foremen.—Division foremen will each have charge of a certain number of cars (probably twenty-five), and the chauffeurs running these cars will come under the direct authority of the respective foremen. Two or more car cleaners will be placed under the direction of each foreman, who will bear the responsibility that their work is done properly. Foremen will also be required to make a general inspection of cars in their respective divisions, according to the detail which will be required by the superintendent, and to promptly report to the superintendent, his assistant or the master mechanic any defects found to exist, so that the same may be remedied promptly. In case of "tire troubles" foremen will report the same directly to the head tireman, who will forthwith cause the defective tires to be replaced.

Foremen will probably be required to act as substitute drivers in cases where the regular drivers are off duty, according to the discretion of the superintendent. They will render whatever assistance may be possible toward the maintenance of the proper discipline and satisfactory operation of the department. Foremen will have no authority over the starters, who will report directly to the superintendent, his assistant or the collector, as stated.

Master Mechanic.—The master mechanic will be in charge of the repair department. and will have under his authority a sufficient number of machinists and helpers to keep the rolling stock of the company in proper repair at all times. He will report directly to the superintendent or his assistant, and any materials or supplies that may be necessary for this department will be ordered by requisition, and he will be required to give a detailed accounting of the distribution or application of any and all supplies and materials so ordered. The master mechanic will report the progress of work in his department according to the system which will be prescribed by the management.

In charge of the master mechanic will be a corps of capable inspectors, whose duties will consist of making regular and careful inspections of all cars, with a view to detecting any possible defects or imperfect adjustment, which must immediately be remedied under the direction of the master mechanic. These inspectors must all pass a rigid examination, which will be conducted by the superintendent before they will be allowed to assume these duties.

Time Clerk.—A time clerk will be employed, who will report the arrival and departure of all cars at the garage, the number and names of the drivers thereof, whether substitute or regular, and upon his weekly report, approved by the superintendent, will be based the payroll of the operative division. The time clerk will obtain data concerning the employees of the repair department from the master mechanic, and the superintendent will designate someone to assist him in the "checking in and out" of cars during the hours when he is off duty.

Head Tireman.—As this company will lease the tires upon the mileage basis, the head tireman will probably be an employee of the tire company. He will, however, be subject to the authority and rules and regulations that apply to the authority of the superintendent, and to rules and regulations that apply to regular company employees. He may have one or more assistants if the superintendent deems this necessary, and will have charge of the replacing and repairing of tires. A tire storage room will be supplied at the garage, and only the tiremen and those in authority above them will have access to this room.

Chief Starter.—The duties of chief starter will consist of directing the movements of the chauffeurs of all cars stationed at locations where no regular starter is maintained, and all collections that are made by such chauffeurs will be turned over to the chief starter, who will give the chauffeurs individual receipts for these amounts, and will in turn hand this money over to the collector, obtaining a receipt from him for the same. He will compare the meter readings of these cars with the daily reports, which will be turned in by the chauffeurs thereof, and will make detailed reports pertaining to the same according to the requirements of the management.

All other starters will be stationed at the various "stands" of the company, and will receive the moneys collected by the chauffeurs whose cars run from these respective stands, as stated. They will compare the meter readings of these cars with the daily reports which will be made by the drivers, comparing their own report sheets therefrom, which they will hand to the chief starter, and which will constitute a part of the general detailed report that he will be required to furnish to the management.

A counter-checking system will be employed, the requirements of which must be faithfully complied with by all starters and chauffeurs, and which will render it im-

possible for any dishonest practices to exist. The duties of chauffeurs, inspectors, cleaners and other assistants will all be in accordance with the requirements of the business; each of these employees will be furnished with a copy of the rules and regulations of the company, and they will be required to comply strictly with the same.

Chart.—The accompanying chart will give a good general idea of the organization of the taxicab company, with its subdivisions and with the authorities and responsibilities of the officials connected therewith clearly designated. Should it be found necessary or deemed advisable by the management or board of directors to make any important changes in this report or the recommendations contained therein, a supplement showing such changes or modifications should be appended hereto.

It is intended that a copy of this organization report shall be furnished to each prominent official of the company, and in case of minor officers a summary of that portion of the report pertaining to their individual position and the duties connected therewith will be given.

#### Reminder of Lamp Lighting Time.

Most of the State automobile laws have a clause giving the time at which lamps shall be lit, as well as specifying their number, position, etc. The time at which lamps must be lighted has generally been one hour after sunset. Under these circumstances the actual need of illumination generally causes the driver to light up at an earlier period than required by law. However, the new Massachusetts law sets the time at one half hour after sunset, and the police of many of the towns and cities enforce this clause quite rigidly. On this account the Boston Athletic Association introduced an idea which might well be copied by garages and automobile clubs. It consists of posting in the garage a small black board on which is painted "Light Auto Lamps at," a space being left where the time and the date may both be entered. This latter feature is a good one, for the reason that in case of neglect to post the time from day to day, one can easily make the proper allowance. Furthermore, some one is almost sure to remind the office of any remissness in this respect,

The German Imperial A. C. has decided to postpone its reliability contest for small cars until next spring, in accordance with wishes expressed by a majority of the entrants.

Dr. Levin-Stoelping, a prominent member of the German Imperial A. C., who represented that club at the last convention of the recognized automobile clubs, died of heart disease recently at the age of forty-five. He was a member of the executive committee of the club, and during his last years he devoted his whole efforts to its work.

#### The Manufacture of Bevel Gears.

By F. E. WATTS.

The following matter is descriptive of the practice of the Vulcan Gear Works, of Detroit, and was obtained through the courtesy of T. F. Ahern, treasurer of the Modern Machinery and Engineering Company, of Cleveland.

The Vulcan Gear Works specialize on the production of bevel differentials and driving gears. The material used for the differential gears and pinions and for the driving gear is carbon steel running from twenty to thirty points carbon. While reasonably high in manganese, it machines rather freely. The driving pinion is made from nickel steel. All the gear blanks are drop forged.

The blank for the large bevel gear is approximately the shape shown in the sketch Fig. 1. It is first chucked by the outside and the hole B is bored and reamed. At the same time the surface A is faced. The reamer used is an ordinary milling cutter with the corners of its teeth slightly rounded on the entering end. This work is done in a Potter & Johnston 81/2x16 inch automatic. One hundred and twentyfive blanks are machined on these surfaces in ten hours.

The blanks are next taken to a multiple spindle drill, where eight holes for the attaching screws are drilled. The drill is a Rockford, and is an ordinary single spin-

The teeth are now roughed out to within about one sixty-fourth of the finished size, with stocking cutters in a Brown & Sharpe

The teeth are produced in the same manner as those for the driving gear.

The blanks for the driving pinion are produced in a large LeBlond lathe with compound rest. The tapered hole and key seats are finished first, leaving the blank



FACING A DIFFERENTIAL GEAR BLANK.

machine. This operation is performed rapidly with a liberal supply of lubricant. Having removed most of the stock in this manner, the finishing cut is taken in a Gleason "generator." This completes the

machine work on the gear. The differential gear blanks, shown in

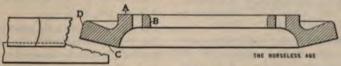


FIG. 1.—DRIVING BLANK AND ROUGHING TOOL.

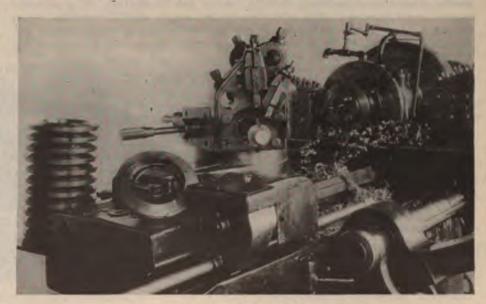
dle drill fitted with a multiple head, which drives the individual drills by spur gears and idlers. The table is made as shown in Fig. 2, to carry away the lubricant. This is copiously supplied through a ring of gas pipe, which surrounds the drilling head, an individual pipe leading down from this header to each drill. The holes are drilled to within a thirty-second of the required size and then finish drilled, so that there is little chance of the drills "running out" in the finishing operation.

After drilling the blanks are taken to another Potter & Johnston "automatic" and chucked by surfaces A and B. They are driven by studs in the drilled holes. Faces C and D are now machined as shown in Fig. 1 and in the photo. Roughing tools work on one side and finishing tools on the other. The faces of the roughing tools are grooved to break up the chips. They work on the side of the work which is coming down while the other tools cut on the opposite side, where it is turning up. The blanks are turned very close to size. The limits being controlled by gauges, made from sheet metal about 3-16 inch thick. An average day's work of ten hours finishes seventy blanks on faces D and C. The outside diameter is between 9 and 10 inches. This operation finishes the blanks.

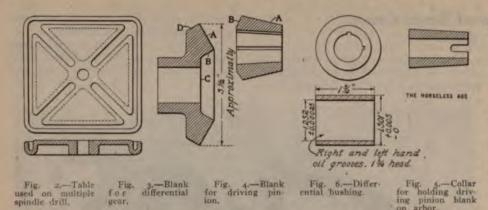
Fig. 3, are also finished on P. & J. automatics. Surfaces A, B, C and D are machined, by the tools shown in the photo, on a No. 5A special machine. The hole and the other end of the hub are finished on one of the large automatics. The output for each machine is 100 in ten hours.

as in Fig. 4. The collar Fig. 5, is slipped in the blank and it is mounted on the arbor, being driven by a half key. Face B is then finished and finally face A. Each of these faces is given the proper angle by feeding the compound rest in by the automatic attachment shown in the photo.

This attachment was made in the shop, and though very simple does the work nicely. It was made as follows: A ratchet bit brace was purchased and the handle straightened out, cut off, and threaded. A new ratchet wheel, with twice the number of teeth of the regular, was cut and attached to the operating spindle. The threaded lever was attached to a crank on the edge of the feed pulley by means of a wire cable passed around two pulleys fastened to the roof overhead. This served to pull the ratchet lever upward. It was pulled down to give the feeding movement



FACING DRIVING GEAR BLANKS.



by a spring attached to the floor. By relieving the operator from the strain of feeding this attachment has increased the output so that from ninety to one hundred blanks may be faced on surface A in a day, and from one hundred to one hundred and twenty-five on the back surface B in ten hours. A small crank is used to feed the cutter rapidly back by hand after a cut is finished. A slightly different class of work is represented by the phosphor bronze bushing for the differential, shown in Fig. 6. The dimensions show what close limits are used where it is desired to reduce the work of assembling.

The bushings are cast with an end of slightly larger diameter for chucking. They are held by this end in a three jaw chuck, placed in the small P. & J. automatic. The first operation is roughing the inside and outside surfaces. The second is to finish-turn the inside and outside, face the end and slightly round the outer corner, so that the bushing will force into place easily. The third is to cut the right and left hand oil grooves. This is done by a threading tool, which cuts the right hand spiral when it goes in and the left hand when it comes out.

The fourth operation is a quick reaming, which removes the slight burr left from machining the oil groove. The fifth is the cutting off. As the cutting off tool is feeding in an arm of the turret, carrying a wire, is fed forward so that when the bushing is cut off it hangs on this wire and is carried out of the way by the next turn of the turret. It can then be removed by the operator after he has chucked the next bushing. One hundred and fifty bushings are completed in ten hours. When we consider that this includes the spiral oil grooves the time will be seen to be remarkable.

A far more interesting piece than either of those described is the housing for the differential gears. In the production of this piece eight tools are used at the same time. This process will be shown in a later article when photos are available.

The American Carriage Builders' Association will hold their thirty-seventh annual convention in Washington, D. C., during the week of October 18. In connection with the convention there will be an exhibition.

#### How to Prevent Injury from Engine Back Kicks.

BY ALBERT L: CLOUGH.

Accidents to persons starting automobile motors continue to be lamentably common in all parts of the country, and their frequency and seriousness are such as to require the careful attention of all who have the good name of the motor car at heart.

These accidents are of two classes, those in which a "back kick" of the motor breaks the operator's arm or otherwise injures him and those in which not only the motor but the car starts when cranking is performed, and the operator is run over or crushed between the car and some stationary object.

As preventives of the first class of accidents the use of an automatic device to prevent the engagement of the starting crank unless the spark position be sufficiently retarded has often been advocated in these columns.

In the absence of such a device the marking of the safe starting position of the spark lever upon its segment and the adoption upon all cars of a uniform practice as to the form and position of the spark control segment, and as to the direction of lever movement to effect advance and retardation, would offer a measure of protection to persons cranking cars with which they are not specially familiar. The adoption of an automatic spark time governor would also be effective. As a preventive of the second class of accidents, arising from the cranking of engines while a gear is in mesh, the use of a safety device ren-

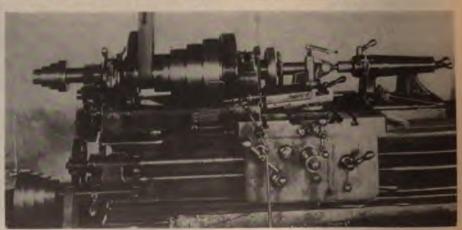
dering it impossible to engage the starting crank unless the gear level is in neutral has been repeatedly urged. Unless both these suggested safety appliances are in use the careless operator is likely to meet with an accident of one or the other kind.

The most obvious preventive of cranking accidents is the entire elimination of the cranking operation, by the provision of seat starting arrangements. If no one is at the crank when the motor makes its first explosion, no one can be hurt, even though the gears be in mesh. A motor starter of the compressed gas type eliminates all danger of this kind and the ability to start a motor "on the spark" does so very largely.

As a very large proportion of the motors now in use are of the four cylinder type, most users can take advantage of starting from the seat if they have a battery system either as regular or auxiliary equipment. Practically any four cylinder engine. even though it will not "spark off" after a long period of idleness, will do so almost infallibly immediately after fresh charges have been drawn into its cylinders. In order to secure immunity from cranking dangers, the operator should crank the motor a turn or two with the spark off, priming the carburetor if need be, then enter the car and throw on the switch from the seat, manipulating the spark lever if necessary. A motor in any sort of condition will start under these conditions, and the procedure involves no danger of a back kick or of being run over,

In the case of cars equipped with ordinary magneto ignition only this procedure of course cannot be resorted to, and cranking accidents may be expected to be more common with such cars than with those fitted with batteries, unless a spark time governor be fitted to the magneto. However, it is probably but a matter of a short time before seat starting provisions will be applied to magnetos—a beginning having already been made in that direction.

It is confidently believed that the adoption of the practice of cranking motors with the spark off and starting from the switch will greatly reduce the number of accidents now occurring.



TURNING A DRIVING PINION BLANK IN A LATHE.

#### THE HORSELESS AGE

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#### A Word as to Future Policy.

As the papers for the transfer of THE Horseless Age were signed only just before last week's issue went to press, it was impossible to give in that issue more than the mere announcement of the change in ownership. When such a change occurs the readers of a publication naturally expect an outline of the policy under which the paper is to be conducted in the future. Old supporters of THE Horseless Ageand there are names on our subscription lists that have been there since the first year of publication-will be pleased to learn that the editorial policy will continue substantially the same as in the past. The chief aim of the editorial staff will be the presentation of material of direct practical interest to the readers of the paper. Utility will be the keynote of the editorial pages in the future as it has been in the past.

THE HORSELESS AGE is now being read by practically every competent technical man in the industry, and as a purveyor of sound technical automobile information we believe it has no peer the world over. It been of the opinion that many devices or

will be the aim of the new management to maintain the high standard in this respect which has been set in the past. The hundreds of practical men in the trade and in the industry whose writings have in the past been placed before an appreciative circle of readers through our columns are invited to continue their collaboration in the future. What we wish particularly is matter based on original investigation or observation in the factory, the laboratory, the shop or on the road.

Aside from the purely technical matter, which at this late day in automobile engineering to be of value must necessarily be of a highly specialized character, increased attention will be paid to the needs of the automobile owner. A series of articles from owners whose training and inclinations fit them particularly to comment on practical automobile topics forms one of the features contemplated for the near future. The Maintenance and Repair Department, which has been a regular feature of the paper for years, will be strengthened; all the other regular departments will be maintained, and in addition we will publish original illustrated reports of all automobile happenings of importance. A paper of the class of THE HORSELESS AGE offers this advantage to the owner in quest of helpful practical hints, etc., that everything appearing in its pages passes the scrutiny of the most expert automobile men in the country, who count among its readers, which is the greatest incentive to watchfulness against misstatements in the first place, and results with almost unfailing certainty in the discovery of any error that may slip through, and its immediate correction. This is a point of no mean importance at a time when so much garbled auto literature is being circulated.

It is not necessary to go further into details. We do not ask you to accept our promises, but to watch our performances. In conclusion, however, we wish to say that the same high editorial standard will be maintained as in the past, and more energy will be put into the conduct of the paper, which we feel certain will insure the rapid growth and improvement of THE HORSE-

#### Cup and Cone Ball Bearings.

The cup and cone (or bicycle) type of ball bearing furnishes an example of a method of construction having been readopted after having once been almost entirely discarded by an industry. We have always

methods of construction that were used and discarded in the early days of the industry would prove much more satisfactory now if applied in the light of the experience of recent years. The bicycle type of ball bearing did not prove very satisfactory in the early steam cars, but that may have been due to the use of too small balls or of balls of inferior material. The fact that it is capable of giving good service even on fairly heavy cars is proven by the fact that it was used quite extensively, until recently, on the make of cars which has won the Glidden Tour six years in succession. It will not be denied, we believe, that the cup and cone bearing is not as fine a type as the modern annular ball bearing; for one thing, it does not possess the fool-proof character of the latter. But it possesses considerable merit from an economic standpoint, as the cups can be produced in the press, and the other parts do not require the same accurate machine work as does an annular bearing. The manufacturing cost of the cup and cone bearing is therefore comparatively low, and this type of bearing appeals particularly to manufacturers of low priced cars, in which the expensive type of bearings would be out of the question.

In the present issue we publish an article on the design and manufacture of the cup and cone bearing, by E. J. Bartlett, We believe that this is the first thorough technical treatment of the subject as applied to automobile work, and feel sure that the article will be read with interest and profit by numbers of our technical readers.

#### Smoky Taxicabs.

If there is any type of car in which a controllable but fool-proof lubrication system is more necessary than in another it is the taxicab. When a car smokes badly on a country road, where there is little traffic, it does not cause much annoyance to anybody, but taxicabs are in continuous use in the centres of street activity in our big cities, where a car belching forth clouds of blue oil smoke constantly offends the eyes and the nostrils of many persons. We have seen crowds collecting in New York city around taxicabs standing at the curb which were pouring out such volumes of smoke that the street gamins evidently thought the car was on fire,

As is well known, the New York Park Board enforces a rule prohibiting smoking automobiles in the parks, which is in itself a very strong incentive to provide taxicab motors with an oiling system that cannot

go wrong. It is, moreover, to be feared that unless the manufacturers of the cabs and the operating companies use the strictest caution the city authorities will also legislate against smoking cars in the streets.

It has been claimed that the park ordinance against smoking cars was the direct result of offenses of taxicab drivers in this respect. The cab chauffeurs, owing to the lower wages paid them as compared with drivers of private cars, are not of the same competence as the latter, and especially during the introductory period were many unskilled drivers employed. It appears that for one reason or another these neglected to give the proper attention to the oiling system of the motors, with the result that cases of damaged bearings and scored cylinders were rather frequent. The company then issued orders to use oil liberally, and the result of this was that taxicabs gained rather an unenviable reputation as "smoke wagons."

In the design of the motor lubricating system for a taxicab account must be taken of the serious objection to overlubrication in these vehicles, and of the fact that the drivers are ordinarily not mechanics and are frequently rushed all day long, which makes a system requiring much attention from the driver unsuitable. If the system of mixing the lubricant with the fuel can be used with the same degree of success in four cycle motors as in two cycle motors it would seem to have much to recommend it for taxicab use, as it would relieve the drivers of all responsibility with respect to motor lubrication, and at the same time insure at least a fair degree of smokelessness.

### A Development of Vehicle Lighting.

A method of incandescent lighting, by means of the complete combustion acetylene flame, directed upon a button of refractory material, is at present being introduced as a substitute for the ordinary luminous flame method generally employed in automobile searchlights. The arrangement is, in principle, a Drummond or calcium light, an acetylene air flame being employed instead of an oxyhydrogen flame, and the incandescing button being possibly of some other material than the quicklime or "calcium" used in the conventional lime light.

It is a fact that gas lighting devices, which depend upon the raising to incandescence of a suitable light giving solid, wher the heat of a gas flame burned upon the Bunsen principle, are generally more efficient than those of the simple flame type, in which the light is produced by the transient heating of particles of carbon in a gaseous mixture, containing too little oxygen for complete combustion.

Attempts have been made to apply to automobile searchlights the Welsbach mantle type of burner, which furnishes a good example of the high gas economy realized with the incandescent method, but the fragility of the mantles has prevented the application from attaining commercial success. It may be presumed that the button form of incandescent body may be made sufficiently rugged to meet the severe requirements of automobile service, and, as the light in a projector is only required to be radiated in a restricted horizontal arc, the button form of light source would seem to be well adapted for the purpose.

Judging from general experience in illumination, the useful light obtainable from a given quantity of gas, used in an incandescence burner of this type, may be expected to be very substantially greater than that from the same quantity of gas burned in the ordinary luminous flame for two reasons: In the Bunsen flame used in the incandescence burner, all the thermal energy in the gas is set free, and no carbon escapes unconsumed. Furthermore, the incandescing body may be of such a nature as to possess a higher luminous emissivity than the carbon particles which afford the light of the open flame burner.

#### The Parts Famine.

For some time it has been apparent that the automobile production for 1910, instead of being limited by the buyers' demand, or by the capacity of the vehicle factories, will be limited by the capacity of the parts factories. For months representatives of newly organized assembling firms have been scurrying over the country with the object of placing orders for engines, transmissions, axles, steering gears, etc., and it is in general very difficult to get promises of prompt delivery. New companies to assemble cars have been organized at an unprecedented rate during the past several months, while there has been no particularly noticeable activity in the organization of parts manufacturing companies until quite recently. Nevertheless the auto parts industry has grown considerably during the past year by the entry into it of many old established machinery

concerns. As a general thing these concerns first accept orders from large automobile manufacturers for parts according to the latter's designs and specifications, and after some experience in auto work has been gained in this way the concern branches out by getting up its own designs of parts for which it solicits orders from assemblers.

The many recent defections from the general machinery industry to join the auto parts industry have caused some little anxiety in the former industry, it would seem. Thus, the *Iron Age* observes that "the departure may be too radical to be wise. Enthusiasm," it says, "for the new product may mean the neglect and serious injury of the old. At present the sucessful automobile part brings the handsome profit which a specialty usually commands. But, as with every other business, the time must come when competition will get down to the normal basis, with profits reduced to the usual level."

Whether the move proves a wise one or not will probably depend upon the particular company and the condition of its previous business. The fact is that automobile manufacturers must have the parts and are willing to pay liberal prices for them, which is generally a sufficient inducement. As most of the new parts firms confine themselves to a limited line of products, and as the cost of the necessary special equipment can be closely calculated in advance, the risks involved are not so great. Undoubtedly all firms that enter the parts industry realize that the present market conditions will not be permanent, but they consider that even after the readjustment of supply and demand the auto parts field will offer as good. if not better, chances as the general machinery field.

#### Pamphlet on Corporation Tax Law.

Henry W. Brooks, Jr., & Co., 15 Wall street, New York, have issued a pamphlet regarding the new corporation tax law, passed by Congress, together with the tariff law, which is applicable to practically all corporations earning over \$5,000 net, as nearly all corporations do an interstate business. The pamphlet explains the method of arriving at the so called net income, which is said to be not in accordance with the manner in which corporation books are kept. Copies of the pamphlet will be sent free of charge upon request if The Horseless Age is mentioned.

Arrangements have been made whereby 300 taxicabs will be placed in service in the streets of Vienna, Austria, by next summer

#### Cup and Cone Bearings.

By E. J. BARTLETT.

The cup and cone or bicycle type of ball bearing has remained practically unchanged since the days of the bicycle, and, later, the early automobiles. With the increase of power, weight and price of the popular types of cars and the advent of the more efficient and more expensive anti-friction bearings, the cup and cone bearing suffered in popularity.

While a comparatively few manufacturers have adhered to this bearing, at least in part, many have regarded it as unsuitable for automobile use. Recently, however, there has seemed to be a renewed interest in the cup and cone bearing, as the demand for cheap and medium powered cars has increased. The majority of the popular 30 horse power, 2,500 pound runabouts and light cars now being manufactured in such large quantities are equipped wholly or in part with this bearing, and it is not unreasonable to suppose that the coming season will see its broader application, as the tendency seems to be toward even cheaper and smaller cars of this class.

With the legitimate popular demand for cars with some kind of anti-friction bearing equipment, its relatively low cost and durability make it one of the logical bearings for cars where cheap and fairly efficient bearings are a necessity. It is also adaptable to a wide range of service conditions, carrying both radial and thrust loads, with approximately equal effectiveness, which feature is found only in the more expensive tapered roller and double annular bearings. It is thus readily seen that for cheap cars its low cost makes it preferable, in competition, to the two types of bearings above mentioned, as well as the expensive annular bearing, while its ability to carry side loads, without the aid of separate thust bearings, gives it important advantages over the cheaper straight roller bearings.

Aside from the relative cost, there seems to be a growing tendency to prefer the cup and cone bearing, when well made, to the annular bearing, where there is considerable side thrust, which the annular bearing has been supposed to be able to carry as the bearing of a front hub.

#### DESIGN.

Fig. 1 shows a typical cup and cone bearing. The race is made of a steel stamping, with its smaller diameter curved in as shown to form a support for the balls when not in place on the cone. A groove on the inside near the edge forms a seat for a stamped split annular retaining ring, which holds the balls in the race before assembling on the cone. In some of the earlier bearings the retainer and lip on the race were omitted, thus making it more difficult to assemble.

This is necessarily a "home made" bearing, or, at least, a home designed bearing, as no manufacturer, to the writer's knowl-

edge, makes a complete line of bearings for the market. For this reason each designer must select his own sizes, materials and mountings, as there is no handy manufacturer who has made a specialty of this work of whom to ask advice. As an aid to selecting the proper sizes Table I is given covering the sizes ordinarily used in automobile work.

In laying out the sizes of a cup and cone bearing equipment it is practically impossible to be governed entirely by the loads the bearings will have to carry, as very few conditions exist where these loads can be accurately computed. Usually some precedent or former experience of the designer is a far better guide. At the present time there are plenty of satisfactory bearing equipments established of any of the recognized standards for all ordinary purposes, and such precedents, tempered with common sense, will produce better results than any theoretical calculation.

As a general proposition, it is better to select a rather generous size of ball for a cup and cone bearing, as the material is probably not as good as in a high grade

tive manufacturers of the different types of bearings.

#### MATERIAL AND CONSTRUCTION.

The material generally used for the cups and cones is a good grade of carbon steel of the following analysis:

- .12 to .18 carbon.
- .20 to .30 manganese.
- .04 or below sulphur.
- .04 or below phosphorus.

As the cones get the harder service, owing to the smaller area of ball track, some manufacturers use a special cone steel. Nearly all the large steel manufacturers have a special kind of steel for this purpose sold under various trade names. A typical analysis of such a steel, which gives rather better results than the plain carbon steel mentioned above and which is also more expensive, is as follows:

- 1.05 to 1.10 carbon.
- .25 to .35 manganese.
  .15 to .20 silicon.
- .025 or below sulphur.
- .025 or below phosphorus.

The balls generally used are of a good grade of case hardening steel made from the bar, and carefully hardened, ground and sized. Some manufacturers prefer forged balls, but while these may be superior to the balls made from the bar, so far as pit-

TWO POINT BALL BRARING.

D = Diam. of Ball R = Radius of Track A = R - D/1 B = A Cos 26°	C = A Sin 26° S = 2 (R-B) S-D = Clearance of Ball n = Number of Balls	$Y = \frac{D + .008}{Sin} \frac{1806}{n}$
	TABLE I.	

D	R	A	В	С	s	S-D	D	R	A	В	С	s	S-D
34	. 175	.050	.045	. 022	.260	.010	%ie ;	.854	.078	.065	.082	.577	.015
516	.205	.049	.044	.021	.332	.010	56	. 394	.082	.073	.086	.641	.016
₩	.240	.053	.047	.023	.386	.011	11/16	.483	.089	.080	.039	. 705	.018
716	.275	.056	.051	.025	. 449	.011	34	.478	.098	.088	.048	.779	.020
1/2	.815	. 065	.058	.029	.518	.018	7∕8	.558	. 121	.109	.053	.898	.028

special bearing, and it is doubtful if the workmanship will be as good. If the equivalent size of an annular bearing is known a rough rule, which the writer has found satisfactory, is to select a ball diameter one size larger than used in the annular bearing for radial loads only, and two sizes larger if there is a radial and thrust load combined. It is not always possible or desirable to follow this rule absolutely, as the conditions of mounting, such as the diameters of shafts or hubs of the differential, necessitate a size of annular bearing other than that required by the load. This is a point in favor of the cup and cone bearing, as it can readily be made to suit the mounting conditions, and in this respect it is very flexible and requires less adapting parts.

To show the comparative bearing equipments used in practice, Table II is given. The equipments are for axles suitable for the popular type of 1910 cars of 25 horse power to 30 horse power, weighing empty from 2,000 pounds to 2,500 pounds, and are largely those recommended by representa-

ting is concerned, they seem more liable to split, due to flaws in the forgings.

A better and more expensive ball is made from alloy steel. Such balls may be procured in this country, but the Hoffman ball,

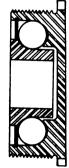


FIG. 2.—ADJUSTABLE BALL CUP.

which is made abroad, is frequently used where the very best cup and cone bearing is desired.

The ball cups are generally made from a steel stamping, as shown in Fig. 1, unless some function other than the bearing is

required, such as an adjustment. In such cases the cups are made from bar stock. It is sometimes possible to save in the number of parts by a very little additional expense, and complication in the cup. Such a construction is shown in Fig. 2; the threaded and castellated portion allows adjustment without the use of additional parts.

The ball track may be either polished or ground, the latter method giving the better results, as the track should then be true and concentric with the cone. A cheaper method often used, especially with the pressed cup, is to polish the track when soft and again after hardening, the first polishing, when soft, removing any surface roughness and making the final polishing operation, after the cup is hardened, easier. This method gives a very nice, smooth surface, but one which is not necessarily concentric with the cone. By careful hardening methods the distortion, due to hardening, may be overcome to a large extent, and with thin pressed cups it is possible to correct some at least of this distortion when pressing them in their seats, if the wall of the seats is heavy enough, so it in turn will not be forced out of its proper circular shape. In other words, it is possible to produce a good cup without grinding if all the conditions are right, but it seems a more dependable method, and in the end as cheap, to grind both the outer diameter and ball track, and polishing the latter to a smooth surface.

Both the bore and the ball track of the cone should be ground after hardening, and the track polished. By hardening the cones on plugs it is possible to keep them very true, and they take but little grinding to produce good results.

Both the cup and cone should be hardened in the ball tracks at least one-thirtysecond inch deep, to prevent the surface hardness breaking through.

As with the cup, it is sometimes desirable to combine the cone with some adjacent part. Fig. 3 shows a cone made a part of a drive pinion.

#### MOUNTING.

Since the cup and cone bearing is not self contained, it may be adjusted for wear (a desirable feature), and either the cup or cone may be mounted in such a way that it may be adjusted. Where possible it is



FIG. 3.—CONE AND PINION MADE INTEGRAL.

preferable to make the cone a press fit on its shaft or hub, and adjust by the cup, since the bearing area is greater. In some places this cannot be done conveniently. and the cone must be the adjusting member. In such cases it should not be left loose, as there is danger of the balls binding and causing the cone to turn on its support. A common method of securing cones against turning on their support is to drill a small hole in the end or cut a small slot at the inner heavy corner, as shown in Fig. 1. A pin fast in some adjacent part or driven in the shaft and projecting in the hole or slot in the cone will then serve as a lock. Such pins should be about threesixteenth inch in diameter, and made of drill rod rather than cold rolled steel, which is a softer material. In a hub, for instance, both cups would be tightly pressed in their seats; the inner cone pressed on the spindle, the outer cone loose on the spindle, but secured against turning by a pin held in a tongue washer placed between the cone and spindle nut. One of the inherent defects of this type of bearing is the possibility of it being carelessly adjusted. It is possible to adjust it too tightly, so one or more of the balls will bind and result in pitting of the ball, cone, cup or all three members. It is important that the adjustment of this bearing be understood by the car user if he is to get the durability of which the bearing is capable.

COST.

To arrive at the approximate cost of a cup and cone bearing, we will assume that the manufacturer wishes to purchase the parts outside his factory. Pressed steel cups, grooved for the retainer, hardened and polished, of the sizes mentioned above, may be bought in quantity for 10 to 25 cents each, depending on the size, the tool cost varying from \$30 to \$50.

The cones may be made on automatic machines, hardened, ground and polished for 20 to 35 cents each.

The retainers cost 2 cents, with a tool cost of \$10.

The approximate price of steel balls is as follows:

									Dollar
3-16	diameter							٠.	.0010
1-4	"								.0013
5-16	"							٠.	.0025
3-8	"								.0037
7-16	"								.0080
1-2	"								.0100
9-16	**								.0135
5-8	**								.0150
11-16	"								.0185
3-4	"								.0250
7-8	"		•	•	•			٠.	.0450

If we assume a certain average size of bearing, as, for instance, the front hub inner bearing shown in Table II, we can gain some idea of the total cost: A fair cost of this bearing in quantities of, say, 1,000 is as follows:

Cup	\$0.18
Cone	. 20
Retainer	. 02
Twelve 5-8 inch balls	. 18
Total	\$0.58

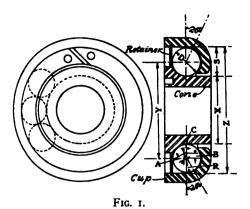
This figure, of course, represents the cheapest cup and cone bearing, but is representative of many of those used. With a better grade of material in the cone and balls the cost would be a little more, perhaps 75 cents for the whole bearing.

Without accurate data as to the relative efficiency of the bearings mentioned herein, it would be unfair to make a comparison of the costs of the different bearing equip-

TABLE II.

SHAFT DRIVE FULL-FLOATING AXLE SET (APPROXIMATE SIZES).

No. Per Set	Location,	Cup and Cone.	Annular.	Double Annular.	Tapered Roller.
2	Front Hub Outer	⅓ Balls 1 inch I. D.—271e O. D.	No. 805—36 Balls 1 inch I. D.—276 O. D.	No. 305—¾ Balls 1 inch I. D.—27/16 O. D.	%s x % Rolls 1 inch I. D.—2%s O. D.
2	Front Hub	% Balls	No. 807—14 Balls	No. 307—1/2 Balls	⅓e x ⅔ Rolls
	Inner	1% I. D.—8% O. D.	1 1/6 I, D.—81/6 O. D.	11/4 I. D.—31/4 O. D.	1¾ f. D.—2¾ O. D.
1	Pinion Shaft	½ Balls	No. 208—¾ Balls	No. 208—½ Balls	¾ x <sup>1</sup> ½e Rolls
	Outer	1½ I. D.—3½ O. D.	1% a I. D.—3½ O. D.	1% is I. D.—3½ O. D.	1½ I. D.—2½ O. D.
1	Pinion Shaft	11/16 Balls	No. 309-% Balls	No. 309-% Balls	%e x % Rolls
	Inner	11/4 I. D.—311/16 O. D.	1¾ I. D815/16 O. D.	1% I. D31% O. D.	1% I. D.—8%e O. D.
2	Differential	1½ Balls 1¾ I. D.—31½ O. D.	No. 309—1/2 Balls 13/4 I. D-315/2 O. D.	No. 309—16 Balls 114 I. D.—31516 O. D.	%e—% Rolls 1% I. D.—\$%e O. D.
2	Rear Hub	⅓ Balls	No. 209—¾ Balls	No. 209—¾ Balls	¼ x ⅙ Rolls
	Outer	1¾ 1, D.—8¾ O. D.	1¾ I. D.—8¾ O. D.	1¾ I. D.—3¾ O. D.	1¼ I. D.—8% 0. D.
2	Rear Hub	1½ Balls	No. 809- 1/8 Balls	No. 809-% Balls	% x % Rolls
	Inner	1¾ I. D.—81546 O. D.	11/4 I. D815/16 O. D.	1% I. D81% O. D.	1% I. D.—₩ O. D.



ments. The intention of the above is rather to give some idea of the possibilities of the cup and cone bearing where the cost of the bearing equipment must be kept at a minimum.

#### The Care of Steering Joints.

The four joints of the steering are apt to be very much neglected. By the four we mean the two ball joints of the steering rod and the two plain joints of the cross coupling rod. Although leather cases are so easily made and so cheaply procurable, many cars are going about with these four joints exposed to mud and dust. There is no better grinding material than road grit and oil or grease, and consequently these four unfortunate joints, which are among the most important on a car, are being rapidly worn away. On the other hand, some users seem to think that if they put leather covers over the joints they can practically neglect them for twelve months so long as they have packed them full of grease before putting on the leather covers. This is a mistake unless outside means of lubrication are provided, and even then it is advisable to remove the covers and to examine the joints occasionally. Some steering joints have little grease cups or small oil lubricators, which project through the leather casing, so that lubricant can be added from time to time; but many good cars are turned out without anything of the sort. The joint is simply smothered in grease, and then the leather case is strapped on. This does very well for a time, but at least four times r year the covers should be removed, the joints thoroughly cleaned with paraffin, and then they should be carefully and copiously oiled begore being repacked with grease. While doing this they should be most carefully examined to see that all nuts and pins are absolutely safe and sound, and that no undue wear has taken place. Of course, the ball joints can be adjusted, but the two plain joints of the coupling rod are non-adjustable, and if much worn it is necessary to fit new pins or to rebush the coupling rod.—The Auto-

In Yarmouth, Nova Scotia, a city of 6,000 inhabitants, thirty-six automobiles are owned.

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9	.480	.740	1.000	.601	.923	1.246	.720	1.106	1.492
10	.569	.819	1.080	.699	1.023	1.844	.839	1.224	1.610
11	.638 .717	.978	1.159 1.238	.798 .897	1.121 1.219	1.448	.967 1.075	1.812 1.461	1.728 1.846
13	797	1.067	1.318	.998	1.819	1.641	1.194	1.580	1.965
14	.877	1.187	1.398	1.096	1.418	1.741	1.814	1.699	2.085
15	.957	1.217	1.477	1.195	1.518	1.840	1.433	. 1.818	2.204
16	1.037	1.297	1.557	1.295	1.617	1.940	1.652	1.988	2.328
17 18	1.117 1.197	1.877 1.457	1. <b>637</b> 1. <b>71</b> 7	1.395 1.495	1.717 1.817	2.040 2.139	1.672 1.791	2.067 2.177	2.443 2. <b>568</b>
19	1.277	1.587	1.797	1.595	1.917	2.239	1.911	2.297	2.689
20	1.357	1.617	1.878	1.694	2.017	2.339	2.031	2.416	2.802
21	1.487	1.698	1.958	1.796	2.117	2.439	2.151	2.586	2.922
22	1.518	1.778	2.038	1.895	2.217	2.539	2.271	2.666	3.042
28 24	1.598 1.678	1.858	2.118 2.199	1.995 2.095	2.817 2.417	2.640 2.740	2.390 2.510	2.776 2.896	3.163 3.282
25	1.759	2.019	2.279	2.195	2.517	2.840	2.681	3.016	3.402
26	1.839	2.099	2.359	2.295	2.618	2.940	2.751	3.136	8.522
27	1.919	2.180	2.440	2.896	2.719	8.040	2.871	3.256	8.642
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12 13	1.392	1.841	2.290	1.589	2.102	2.615	1.786	2.363	2.940
14	1.581	1.980	2.429	1.748	2.261	2.774	1.964	2.541	3.118
15	1.670	2.119	2.568	1.906	2.420	2.933	2.142		3.296
16	1.809	2.258	2.707	2.065	2.578	8.092	2.822	2.899	8.476
17 18	1.949 2.088	2.897 2.537	2.846 2.986	2.224	2.788	8.251 3.410	2.501 2.690	8.079 8.257	8.655 3.8 <b>3</b> 4
19	2.228	2.676	8.125	2.543	3.056	8.569	2.859	8.436	4.013
20	2.367	2.816	3.265	2.702	8.215	3.729	8.028	8.615	4.199
21	2.507	2.950	8.404	2.862	3.875	8.888	3.217	8.794	4.371
22 23	2.647 2.786	8.095 3.235	3.544 3.684	3.021 3.181	8.535 3,694	4.048	8.396 8.575	3.978 4.152	4.550 4.729
24	2.186	3.235	8.824	8.340	8.854	4.367	8.756	4.333	4.910
25	8.066	8.515	3.964	8.500	4.014	4.527	8.986	4.513	5.090
26	8.206	8.656	4.104	8.660	4.178	4.687	4.116	4.693	5.270
27	8.846	8.796	4.244	3.820	4.333	4.847	4.296	4.878	5.450
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18	1.988	2.625	8.966	2.180	2.896	3.591	2.877	8.147	3.917
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15	2.890	8.021	8.662	2.616	3.822	4.027	2.852	3.622	4.892
16 17	2.578	3.219 9.419	8.860 4.059	2.884 3.058	3.589 3.758	4.245	8.090	3.860	4.630
18	2.777 2.975	3.418 3.617	4.258	8.271	3.977	4.464	8.828 3.567	4.098	4.868 5.107
19	3.174	3.816	4.457	8.490	4.196	4.901	4.805	4.575	5.845
20	3.878	4.015	4.666	8.709	4.414	5.119	4.044	4.914	5.568
21	3.572	4.214	4.856	3.928	4.688	5.888	4.285	5.065	5.825
22 23	8.772 8.971	4.418	5.054 5.254	4.147	4.852 5.071	5.567 5.776	4.522	5.291 5.580	6.061
24	4.170	4.811	5.458	4.586	5.290	5.996	4.999	5.769	6.589
25	4.370	5.011	5.652	4.804	5.510	6.215	5.288	6.008	6.778
26	4.569	5.811	5.852	5.014	5.729	6.435	5.478	6.248	7.017
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28 29	4.968 5.167	5.610 5.809	6.951 6.450	5.463 5.682	6.168 6.387	7.092	5.966 6.195	6.726 6.965	7.496

# Maintenance and Repairs



#### Some Hints on the Care of Tires.

The cost of pneumatic tires, for repairs and renewal, constitutes in every case one of the most important items among the running expenses of an automobile, so that the owner bent on economizing in the upkeep of his car may well start by endeavoring to save his tires as much as possible. The tire item has gained still further in importance of late through the repeated rises in the prices of tires. The rapid wear of the tires is conditioned by the great weight they are called upon to sustain, the rough roads the cars are driven over and the high speed at which they are frequently driven, and in such hard service the tires cannot well be expected to be long lived, but there are many little kinks and expedients that are not known to the average novice driver which permit of materially lengthening the life of the tires.

#### LARGE TIRES MOST ECONOMICAL.

In order that the tires may wear well and not be a source of continual trouble, it is of the first importance that they be of liberal size in proportion to the weight of the car and its load. Often, if the tires suffer continually from punctures and bursts, instead of condemning the make of tire forthwith the user will do well to see whether they are not overloaded. Although a general table of permissible weights applicable to all makes of tires might be given, it is better to base this investigation on a table of permissible loads issued by the particular manufacturer, for the reason that the different makes of tires differ somewhat in respect to strength of walls and other particulars, and therefore in respect to carrying capacity. If it is found that the car manufacturer has stinted the tire equipment, it will be advantageous, after the first set of tires has worn out, to use a size larger tires all around. This is facilitated by a recent move on the part of several tire manufacturers, who have brought out tires of such shape as to fit the rim for the next size smaller standard tire. Thus 31/2 inch tires may be placed on 3 inch rims and 4 inch tires on 31/2 inch rims without any extra expense besides the cost of the tires. The advantage of using large tires in proportion to the load to be carried is now generally recognized and has received a striking recognition by the recent adoption of very large tires on the cabs of the principal New York taxical companies.

#### PROPER INFLATION.

If the tires are of the proper size, the next thing to look out for is that they are kept properly inflated. Running with a partially deflated tire is the cause of destruction of a great many pneumatic tires.

If the air pressure in the tires falls below a certain point, dependent upon the size of the tire and the load carried by it, the side walls of the tire are unduly bent and the fabric layers in these walls are subjected to extreme stresses which cause what is known as rim cutting. Pumping up a large tire by hand is quite an arduous task, and it is a fortunate thing that in all the public garages compressed air is now kept on tap, as it were, which enable the driver to inflate his tire without physical exertion. Many of the larger cars are now also equipped with air compressors, which form either a part of an automatic starting mechanism or are fitted specially for the inflation of tires.

The tires should always be inflated by gauge to the pressure recommended in the tire maker's catalogue for that particular size, and it is important that the pressure gauge or manometer be connected directly to the valve stem, and not to the pump, as otherwise the resistance of the valve to the passage of the air will affect the reading and cause the gauge to give incorrect indications.

#### JACK CAR UP WHEN IDLE.

When a car is not being used for an appreciable length of time, it should always be jacked up or propped up, so as to take all of the load off the tires. If the load remained on the tires, the latter would lose their pressure in the course of time, and the fabric in the side walls at the point of the tire nearest the ground would then be unduly strained and likely be permanently injured. If the car is to be laid up for many months, it is the best plan to remove the tires entirely and to wrap up the outer covers and inner tubes separately and store them in a dark room not exposed to extreme temperature changes. If the tires are thus removed, it is advisable to carefully examine the bead portions for any traces of rust, which should immediately be thoroughly cleaned off, and the rims should also be thoroughly cleaned of rust and given a coat of air-dry enamel to protect them against rust during the period of non-use Before the outer covers are stored away they should be allowed to dry in the open air for a day or so, to permit the moisture which may have entered any cuts in the tread to escape.

#### TREATMENT OF CUTS.

To prolong the life of outer covers they must be closely watched for cuts and tears developing in the tread portion. If the cut does not extend entirely through the rubber portion of the tread, it may be filled with tire cement and then vulcanized with a home vulcanizer of either the steam or electric variety. If the cut extends entirely through the outer rubber layer to the fabric, it is a very serious matter, for then the moisture of the road will get into the fabric and rot it in short order. It is a somewhat peculiar fact that, whereas moisture lengthens the life of rubber, it affects the fabric very prejudicially. In the case

of deep cuts extending entirely through the outer rubber protector, if the tires are continued in use sand and dirt will usually work through the cut and in between the separate layers of fabric, thus causing what is known as a blister or swell. This considerably reduces the resistance of the tire at that point to sudden shock and pressure, and after a tire has been damaged in this way it is usually of very limited serviceability. When deep cuts are suffered which the owner cannot repair himself, it is advisable to immediately send the tire to the factory and have it repaired there, if it is still in condition to be repaired.

#### UNDUE WEAR OF FRONT TIRES.

It has often been observed that the front tires on a car wear even faster than the rear tires, in spite of the fact that the rear ones have to carry by far the largest weight, and in addition have to support the strains due to driving and braking. If this trouble is experienced, an examination will very likely show that the front wheels are out of alignment. This disalignment may be due to a considerable number of causes which were recently investigated by one of our French contemporaries. Some of these causes are as follows:

Steering tie rod improperly adjusted. Steering knuckle arms bent. Wear in front wheel bearings. Wear in steering knuckle pivot. Looseness in steering joints.

The effect of want of alignment between the two front wheels was discussed at considerable length in our "Communications" columns about a half year ago, and a number of experts who discussed the question in special articles arrived at the conclusion that the wheels should be set so as to be perfectly parallel, and should neither be "toed in" nor canted. When the wheels are not perfectly parallel there is a continued grinding effect, the results of which are plainly perceptible on the tread.

#### DON'T TWIST WHEELS ON FLOOR.

Wherever it is possible the car should be started with the front wheels in the straight ahead position, and the wheels only moved over to one side or the other after the car is in motion, as the wrenching around of the wheels on the ground when the car is stationary is quite injurious to the tires. In city driving where frequent stops are made alongside of the curb, care should be taken not to drive too close to the curbstone, so the tires will not rub up against it, which is quite injurious to the side walls. Running in car tracks is also to be disapproved of.

#### FIERCE CLUTCH AND BRAKE ACTION.

Under ordinary conditions the rear wheels naturally wear much faster than the front wheels, for the reasons already pointed out. Careless driving will further shorten the life of the rear tires, especially when it is exemplified by letting the clutch in suddenly and jamming on the brakes. The strains of any sudden variations in

the motion of the car, either increases or retardations of the speed, must be borne by the driving wheel tires, and naturally affect their life very seriously. If it is found that the clutch action is "fierce," the clutch should be given a treatment with castor oil or some other lubricant which will make it take hold more gradually while not preventing its holding when engaged at full pressure. The brakes should always be applied as gradually as possible, unless a quick stop is imperative; in fact, the brakes should be used as sparingly as possible, and the car always be allowed to come to a stop of its own account, as far as possible.

#### VULCANIZE PATCHES.

When patching inner tubes it is advisable to vulcanize the patches, especially on fast cars which are used for long trips during the hot season, as the heat engendered by the friction between the inner tube and the cover, and between the separate elements of the cover, tends to loosen the patches if they are not vulcanized. There are now a number of simple and inexpensive vulcanizers for inner tubes on the market, and every garage should be equipped with one. Where the patches are not vulcanized, however, care should be taken not to start out with patched tubes on a long tour, as the patches are likely to come loose when the car is being driven continuously at speed, and give considerable trouble. It is better to start out with new tubes and to use up the old ones in winter time in city and suburban driving. To reduce the friction between the cover and the inner tube, the inner surface of the cover should be strewn with talc before the tube is introduced. This also tends to prevent pinching of the inner tube, which is a frequent cause of injuries to it. It has recently been proposed to use flake graphite to lubricate the inner surface of the cover, but we have not yet heard regarding experiments with this material for this purpose.

Oil, kerosene, etc., are enemies of rubber and it is dangerous to stand a car on a greasy floor.

### Emergency and Roadside Repairs—II.

By H. H. Brown.

One way in which the roadside repair differs from a repair made in the shop is that, as a general thing, it is made only in order to get the car home or to a place where a more permanent repair can be made.

Take, for instance, the case of a four cylinder motor in which one of the exhaust valves is broken. While the motor will not run with its accustomed smoothness, yet it will run, and it is a matter for the owner's or driver's judgment, whether under the circumstances it is desirable to do anything more than remove the broken valve from the cylinder in order to avoid further trouble. However, in the case of a broken inlet valve the situation is quite different.

as under these circumstances the carburation of all the cylinders is likely to be affected. Fortunately, however, this trouble is comparatively rare.

If a spare happens to be carried it, of course, can be fitted in place. If there is no spare and the exhaust valve is a duplicate of the inlet valve, as it now generally is, then the exhaust valve can be shifted to the inlet valve position and used as such in order to prevent interference with the carburation from the open inlet port. If this cannot be done the inlet port to that particular cylinder should be plugged in some manner, the exhaust valve removed and the ignition cut off from that cylinder. This is preferably done by grounding the secondary lead to that cylinder in case a magneto is used. In the case of a multiple coil system the vibrator for the coil may be put out of action by slacking off the adjusting screw or simply placing a bit of cardboard or paper between the points. In the case of a broken exhaust valve it might be as well to put the inlet valve out of action, if this can easily be done.

It is a good idea to carry at least one extra spark plug, which is known to be in good order, and to see that it is carried in such a manner that it will remain in the aforesaid condition. However, with a four cylinder motor this is not absolutely essential, although at the first opportunity a plug which is broken down should be replaced.

Right here it may be as well to speak of a habit which is comparatively common among operators, especially among owners who care for and drive their own cars, and that is the habit of carrying "deadwood" in the repair kit. The most common example of this is the carrying of broken plugs, and probably next in order come punctured or blown out inner tubes. Only one instance has ever come to the writer's attention in which a broken plug might have been of use. In this instance a four cylinder car was fitted with two complete sets of ignition, an individual coil and a magneto system. One of the plugs of one cylinder "went bad." This was on the battery side. As the battery was only used for convenience in starting this did not bother much. However, the plug was rather a poor specimen, and eventually the central electrode was blown bodily out of the porcelain by the force of the explosions. This left a hole about an eighth of an inch in diameter through which gas and air were free to pass, The noise made under these conditions was of such a quality and volume as to make the owner of any of the modern exhaust blow whistles green with envy. Fortunately, a garage where a new plug could be obtained was comparatively close at hand. Even in this instance, had the garage not been handy, some remedy probably could have been devised.

Perhaps, however, there is considerably more excuse for carrying round an old inner tube than a broken spark plug. The uses to which it may be put are legion. For instance, it may be used for washers at va-

rious points to reinforce inner tubes where there is a small blow-out in a shoe, and even on occasion as a rubber water pipe connection where the regular hose has sprung a bad leak, although in this case a portion of it could probably be used to much better advantage to stop the leak with the aid of some string or wire.

A most interesting example of how old inner tubes may be used was brought to light in the case of an experienced driver. who was unfortunate enough to have four punctures or blow-outs in one day. Thus all of his spare tubes were exhausted. It was apparently a case of waiting or riding home on the rim. However, the following expedient was tried with good success: The valves were removed from two of the punctured tubes, and these tubes were placed with the third inside the outer casing. The other edge was then put in place, which was not accomplished without some difficulty, and the security bolts were screwed down tight. The result was that the car was driven home quite a distance, and no damage resulted to the tire from rim cutting. However, the exceptions prove the rule. If one is determined to carry punctured inner tubes they should be so marked as to be unmistakable, as it is rather provoking after placing a tube in a shoe to find that the one just put in place is no better than that which was removed.

### Contract for Michigan License Plates.

The Burdick Enameled Sign Company, of Chicago, will probably get the contract for the automobile number plates to be issued in Michigan the coming year. An order for at least 30,000 of these plates will be given, as two plates are required on each car, and there are now more than 12,000 cars in the State. The license fee in Michigan is \$3 and the number plates are furnished applicants free of charge. The plates will have a white background and have the number stenciled on them in black, together with the word "Michigan" and the State seal. The new number plates will be issued the first of the year, when all licenses must be renewed.

#### Foreign Market for Taxicabs.

An American consular officer in the Far East reports that there is an excellent opening for the introduction of taxicabs in a large city in his district. The operators of such a style of vehicle would be exempt from the existing carriage regulations, and, owing to the inadequacy of the present cab system, a large profit should be realized. Additional information can be obtained from the Bureau of Manufactures, Washington, D. C., by referring to No. 3,959.

L. L. Heller, president of the Sterling Motor Car Company, of Binghamton, N. Y., was instantly killed near Waverly, N. Y., on October 6, when his car was struck by a Lehigh Valley train at a crossing and completely wrecked.

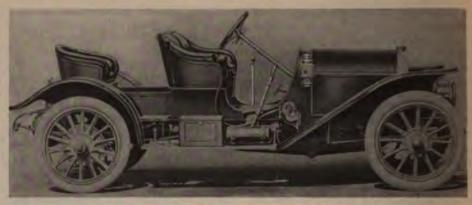
# NEW VEHICLES AND PARTS



#### Stoddard-Dayton Models for 1910.

The new models of Stoddard-Dayton cars, manufactured by the Dayton Motor Car Company, of Dayton, Ohio, differ from the previous models chiefly in the refinement of details. Three distinct sizes of power plant, mounted in some seven different chassis, are again offered for the coming season; all models show a slight increase in wheel base and general capacity, together with a slightly higher horse power rating. The 30 horse power chassis is now offered with 108 inch wheel base; the 40 horse power with 116 inch wheel base for both roadster and touring car, and the 50 horse power with 120 inch for the roadster model and with 128 inch for the touring car. The 30 and 40 horse power touring cars are five passenger cars, while the 50 horse power is of seven passenger capacity, carrying rather unique folding auxiliary seats. which have been furnished for the past two seasons. The roadster models carry a large variety of bodies, including single and double rumble, artillery seats and two different types of miniature ton-

A 30 horse power chassis especially designed for closed town cars has been added to the line. This chassis is of 108 inch wheel base and will carry three types of closed bodies, viz., limousine, landaulet and a town car with short peak. Inside driven coupé and large limousine or landaulet bodies are also furnished with the other chassis, thus making quite a large line of closed cars.



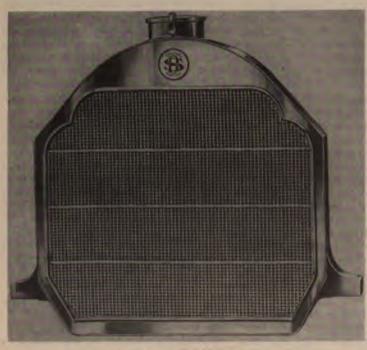
STODDARD-DAYTON 10C 40 HORSE POWER ROADSTER.

Among the constructional changes may be mentioned the adoption of the cellular type of radiator, three-quarter elliptic rear springs, the placing of the gasoline tank in curved brackets symmetrical with the upper part of the three-quarter elliptic spring at the rear of the car, and cutunder bodies on all touring and closed cars, with an artistic and original fender design, which continues the contour of the wheel house through to the tip of the fender, with just a slight upward flare at the end. The French type of rear wheel has also been adopted, in which every other spoke is bolted to the brake drum, which is of very large proportions.

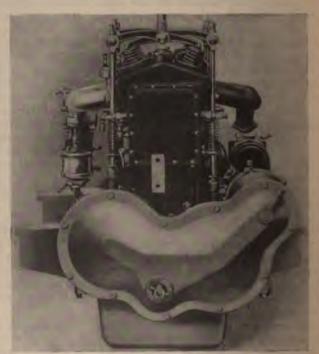
The changes made in the motor on the 40 and 50 horse power cars are hardly noticeable. The same general cylinder design with spherical combustion chamber is employed, but the valve operation has been changed in that two cam shafts are now employed with double push rods, which permits of overlapping of the valve opening periods. Practically the same sort of walking beams are employed as formerly with the single cam shaft and push rod, both walking beams being carried on a single yoke, and offset in such a manner as to avoid the staggering of the valves.

A slight change has also been made in the exhaust valve cage, which is now held in place by a double yoke, which is given a slight tension on a stud midway between Nos. 1 and 2 and 3 and 4 exhaust valves. The exhaust and intake sides of the motor have been reversed from last year, which makes for a better distribution of the accessories, including the pump, magneto and carburetor. The two sets of spark plugs are now located upon opposite sides of the motor. This permits of a simple and neat arrangement of the wiring. The usual battery ignition coil has been removed from the dash and is now housed under the hood, thus leaving the dash perfectly clean, with the exception of the switch, oil and gasoline gauges.

The principle of interior motor lubrication has been retained, but a rotary



NEW CELLULAR RADIATOR.



FRONT VIEW OF MOTOR.

pump is now used instead of the former plunger pump.

All models for the coming season will have double ignition-by magneto and battery. On the 50 horse power models, known as F and K, this system comprises a Bosch magneto and the Delco system, this latter consisting essentially of an especially designed non-vibrating four coil induction unit, a master circuit breaker and kick switch of new construction; coil and circuit breaker are enclosed in a heat and oil proof steel jacket which permits of the same being placed under the hood. On the 30 and 40 horse power models (A, C, H and B) the Splitdorf dual system will be employed, the induction coil for the battery system being carried on the side frame member under the dash, the same as in the other models.

The change gear and the gear shift levers remain in the same location. A new universal joint is located between the change gear and the drive shaft, which eliminates the leather boot previously used, and is designed for the retention of grease, with which it is packed.

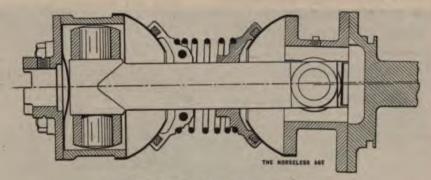
A simple brake equalizer has been devised, and the braking surface has been greatly increased by increasing both the diameter and the width of face of the drums. All models have both a foot and an emergency brake, these being of the usual expanding and contracting design. The foot brake, which is the outside or contracting band, is now supported by a spring operated release, which eliminates any possibility of drag-

ging when not employed.

Every part requiring lubrication is provided with a grease cup, including the spring shackles, spring seats on the rear axle, radius rods, roller bearing at the front end of the propeller shaft, propeller shaft and torsion tube support, speed changing mechanism, steering gear, steering gear distance rods, starting crank and all parts of the motor that are not taken care of by the self contained oiler. The equipment of each car comprises a lubrication chart. All bodies on 1910 cars will be constructed of reinforced aluminum, and a very liberal option as to finish and upholstery is offered.

#### Novel Storm Protector.

G. C. Hanch, treasurer of the Nordyke & Marmon Company, Indianapolis, has invented a novel arrangement of inside curtains. Instead of having, as usual, several side pieces, Mr. Hanch uses but one piece for each side. In place of the ordinary celluloid storm front he employs a standard wind shield, to which the two inside curtains are fastened. In case of a storm breaking when en route the top can be put up, the wind shield raised and the curtains attached without any of the party getting wet. A light metal tube is attached to the back of the front seats in which the



STODDARD-DAYTON NEW UNIVERSAL JOINT.

side curtains are carried, rather than folding them up and carrying them under the rear seat, as is customary. Rolling the curtains and carrying them in this tube prevents cracking.

The Frayer-Miller Trucks for 1910.

Having abandoned the manufacture of pleasure vehicles, the Oscar Lear Automobile Company, of Springfield, Ohio, are devoting their whole attention to the production of the Frayer-Miller trucks. They make 1, 2 and 3 ton trucks. The 3 ton, their leader, is a facsimile of the others, only larger in proportion, and only it will be described here. No radical changes are found in the 1910 product, simply minor refinements.

The principal changes are an increase in the bore of the cylinders which adds about 5 horse power; the adoption of the splash oiling system in the crank case, of a disc clutch, a three point suspension and a bumper or gasoline tank guard in front.

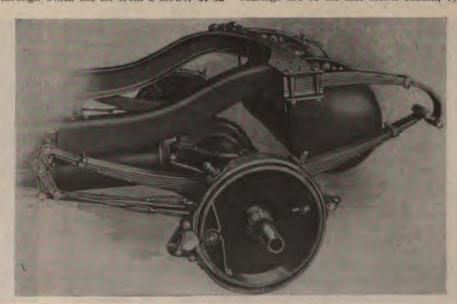
The cylinders, which are air cooled, are cast separately and covered with small bosses or projections to increase the cooling area and thereby aid in the cooling. The bore is 43% inches and the stroke 53%

The cylinders are covered with aluminum cases, which are part of the air shaft through which the air from a blower of 12

inches diameter and 4th inches depth passes, giving a positively conducted forced draught for cooling. The blower has sixtyfour corrugated blades, runs on annular ball bearings, and is driven by a Renold silent chain. The valves are both in a chamber above the cylinder, forming part of the cylinder head, and are contained in removable cages. They are easily accessible for grinding or inspecting. The valves have cast iron seats screwed and brazed to nickel steel stems, and are actuated by means of cam shafts on opposite sides of the motor. The valve lifters work on the valve stems through bell crank levers which increase the cam motion.

The pistons are 5 inches long, with flat heads, and have four eccentric compression rings with a 45 degree joint. They are ground on three sides. The piston pin is of nickel steel, fifteen-sixteenth inch in diameter and 41/4 inches long. The pin is hollow and held in place by two set screws. After the pin is in place a wire is put through the centre and through holes in the set screws that hold the pin in place, and in this manner the set screws are securely locked.

The piston pin bearing is of phosphor bronze, and the oil hole in the top is countersunk at a wide angle to catch oil from the splash. The lower connecting rod bearings are of die cast nickel babbitt, 15%



STODDARD-DAYTON 1910 REAR CONSTRUCTION.



FRAYER-MILLER TRUCK WITH OPEN DELIVERY BODY.

inches in diameter and 23/4 inches long. The connecting rods are drop forged of I section, with marine bearing caps held in place by two studs. The connecting rods and crank shaft are both made of 45 point carbon steel. The cam shafts are seveneighth inch in diameter, hardened and ground. The cams, which are also hardened and ground internally and externally, are keyed and pinned to the shaft. The bronze cam shaft gears mesh with a steel crank shaft pinion. The gears are housed in an oil tight compartment cast integral with the aluminum crank case. The crank shaft is drop forged, heat treated and ground, and has three main bearings. The diameter of all the bearings is 15% inches. The lengths are as follows: Front bearing, 3 inches; centre bearing, 3 inches; rear or flywheel end bearing, 4 inches.

The crank case is in two parts, the lower portion being independent of the crank shaft bearings. The upper portion is reinforced by I beam construction to avoid the possibility of getting out of alignment.

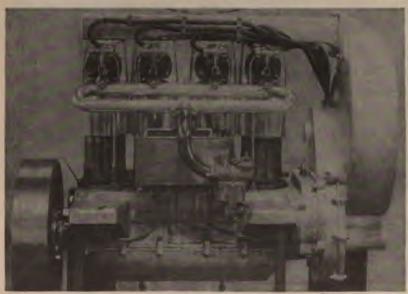
The mechanical oiler is located on the right side of the motor, directly beneath the inlet manifold. The inlet manifold is a complete ring, with the inlet chambers on one side and the carburetor in the centre on the other. A Breeze carburetor is used. The flywheel is of cast iron, of 1734 inches diameter and 334 inch face. The clutch is of the multiple disc type, plain steel plates working between steel plates covered with composition. It is claimed that this design does not require any oil. The releasing collar works through a ball thrust, and the clutch spring is also carried on a ball thrust. A universal joint between the clutch and transmission permits the easy removal of the clutch. A disc brake is attached to the direct drive shaft just back of this universal joint, and when the clutch is thrown out the same motion of the pedal applies this brake, stopping the gears so they can be changed quickly.

The change gear has four speeds forward and one reverse, and is of the selective type. The gear casing is an aluminum casting of elliptic cross section, with manganese bronze heads. The shafts, both of which are square, are hardened and ground and carried on annular ball bearings, and

the male end of the direct drive shaft is supported by an annular ball bearing in the end of the direct drive gear. The gear case is oil tight, having stuffing boxes at both ends of the direct drive shaft.

The propeller shaft has two universal joints of the block and trunnion type, and connects the change gear with the jack shaft. On the driving bevel pinion shaft is located the foot brake operating on a drum. In the centre of the jack shaft is located the differential, which is of the bevel pinion type, and runs on annular ball bearings. The jack shaft is supported at both ends by annular ball bearings. Whitney chains of 1¼ inch pitch, with three-quarter inch rollers and three-quarter inch wide, connect the rear wheel sprockets with the jack shaft sprockets.

The rear axle is a 2½ inch square har, with the wheels running in Timken roller bearings. The front axle is a 4 inch I section drop forging in a single piece, and has a 4 inch drop in the centre. The front wheels are carried on Timken roller bearings, and the pivot bolts have Timken roller bearings to ease the steering gear.



INLET SIDE

FRAVER-MILLER MOTOR



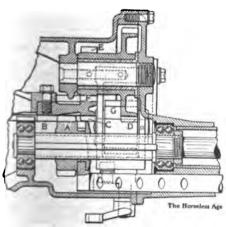
FRONT VIEW,

The wheels are all of the artillery type, 36 inches in diameter. The front wheels are shod with 4 inch solid rubber tires and the rear wheels with 31/2 inch dual solid tires. The main frame is of 6 inch channel steel and the sub-frame of 4 inch channel steel. The sub-frame is provided with a flexible bearing in front, which prevents binding of the motor and change gear shafts when traveling over a rough road with full load. A. L. A. M. standard threads and screws are used throughout, with castled nuts and bolts. The front springs are semielliptic, 40 inches long by 3 inches wide, with ten leaves. In the rear there is a three point platform spring, the side members of which are 40 inches long by 3 inches wide, with twelve leaves, while the cross member is 38 inches long by 3 inches wide, and has sixteen leaves.

A worm and nut steering gear, with a 20 inch wheel, makes the car steer quite easily with a load. The control levers for spark and throttle are underneath the steering wheel.

The motor is located directly under the driver's seat, with the change speed lever and emergency brake lever at the driver's right hand. There are two brakes, one expanding in the rear wheel drums and one contracting on the differential. The rear wheel brakes are the emergency brakes and are operated by a hand lever; the differential brake is the service or foot brake. The loading space back of the driver's seat is 12 feet long and 56 inches wide. The gasoline is carried in a flat tank in front of the dash, which holds 13 gallons. It has a reserve compartment, which will carry the car 10 miles after the first warning is given. The wheel base is 128 inches, the tread 66 inches, and the road clearance 111/2 inches. The Atwater Kent system of ignition is used.

The regular equipment comprises two side oil lamps, one oil tail lamp, a horn, a jack and a tool kit. Tools and batteries are carried in a watertight sheet steel box built into the running board. There is also a compartment between the seats in which small tools and an oil can may be kept.



TRANSMISSION PORTION OF PROBST TRANS-MISSION AXLE, TYPE B-2, SEMI-PROGRESSIVE.

#### Speedwell Changes for 1910.

Only changes of minor importance have been made in the Speedwell car manufactured by the Speedwell Motor Car Company, of Dayton, Ohio, for 1910. These changes have been made with the object of increasing the comfort of the occupants and of refining the mechanical details. They can be summed up in a few words.

The wheel base has been increased to 121 inches, the springs have been made wider, the wheels increased in diameter from 34 inches to 36 inches, and the body has been hung 3½ inches lower to the ground. The valves have been removed from the right to the left hand side of the motor, and the water pump and Bosch magneto are now placed on the right hand side. A dual ignition system is being fitted. The front axle has had much of the drop taken out of it, making it nearly straight, and thus giving greater road clearance. The space between the running board and the body is closed in, and the sod pan is hung by means of spring fastenings, which make it easy to remove.

The company will continue to make only one type of chassis, equipped with a four cylinder motor of 5 inch bore and stroke each. A considerable variety of bodies are offered, however, and some of the body designs are new, including the Torpedo roadster and the touring car bodies. The only part carried on the dash is the combined coil and switch of the dual ignition system.

The gasoline is stored in a square tank under the front seat, holding 18 gallons, except on the roadster, where an elliptic tank can be had back of the front seat holding 25 gallons. Thirty-six by 4 inch tires are provided on all models, except the seven passenger touring cars and the limousines, which are equipped with  $36\times4\frac{1}{2}$  inch tires.

All cars are equipped with two gas lamps, generator, two side oil lamps, one oil tail lamp, horn, jack, tool kit, tire repair kit, pump, battery box, tool box, robe rail, foot rest and Bosch magneto.

#### The Probst Transmission Axles.

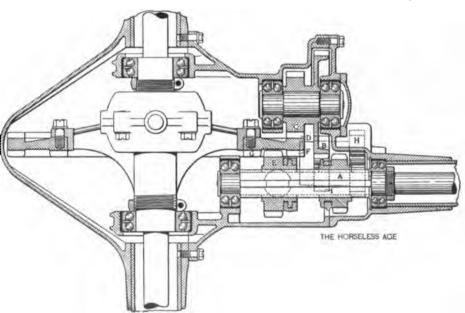
These change gears illustrate the fact that new methods of machining gears often bring neglected types into use. In this case the novel feature is the use of a series of crown gears in place of the usual bevel and spur reductions. These crown gears have all the generating lines of their teeth perpendicular to the axis of their shaft. The teeth are cut in a Fellows gear shaper, by means of an attachment which rotates the crown gear in a plane parallel to the travel of the cutter. They mesh with ordinary spur pinions, which are slid into mesh with different sizes of crown gears to get the various speeds. The 20 degree stub tooth is used throughout. It is claimed that a line contact is obtained.

The semi-progressive type, B-2, is for cars of from 10 to 16 horse power at 1,000 r. p. m. The gears are 7-9 pitch, with three-quarter inch face. The main shafts and axle shafts run on New Departure bearings.

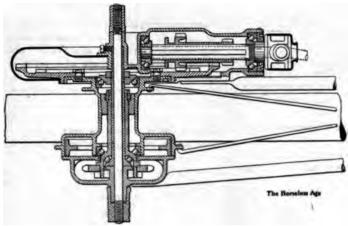
For the first speed power is transmitted through gears A, D, E, F. For the second speed gears A and C are in mesh; for the third speed gears A and B. Thus both high speeds are direct. To obtain the reverse, gear A is slid into the neutral position and pinion G is swung up to mesh with A and D. Power is then transmitted through gears A, G, D, E and F.

In the selective type of gear, D-3, New Departure bearings are used throughout. Second and third speeds are obtained by sliding pinion E, which meshes with F for the second and with G for the third speed. These and the back gears are 5-7 pitch. The other gears are 6-8 pitch. The faces are three-quarter and fifteen-sixteenth inch, respectively. The gear is recommended for cars of from 22-30 horse power at 1,000 r. p. m.

The first speed and the reverse are obtained by sliding pinion A. For the first speed power is transmitted through A, B, C



PROBST TRANSMISSION AXLE, TYPE D-3, SELECTIVE.



PROBST MOTORCYCLE GEAR SET, HORIZONTAL SECTION.

and D, and for the reverse through A, H, I, B, C and D.

A very simple gear, giving two speeds forward, with no reverse, is made for motorcycles.

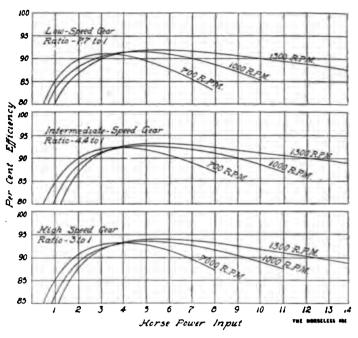
The automobile type of gear has been tested by the General Engineering Company, of Syracuse, with the results shown in the following curves. These show the crown gear to be efficient for moderate powers. It will be seen that the best efficiency on the low gear is only 1½ per cent. lower than that for the intermediate. As the torque increases the efficiency falls, so it is probable that these change gears will find their widest use on cars of moderate power. These gears are manufactured by the Seagrave Company, of Columbus, Ohio.

#### Two Warner Parts Companies.

T. W. Warner, who in June last sold out his interests in the Warner Gear Company, of Muncie, Ind., has since organized two separate companies for the manufacture of auto parts. The Warner Manufacturing Company, of Toledo, has the contracts for 1910 for the Overland transmission and steering gears. The Overland Company gave up one of their large buildings to the Warner Company for this purpose. Though both companies occupy the same building they are entirely independent of each other. The T. W. Warner Company, of Muncie, devote their whole attention to the production of cone clutches and steering gears, while the Warner Manufacturing Company at Toledo devote their time to transmissions alone and gears. It is intended to combine the two companies in the spring and build a large factory at either Detroit, Toledo or Muncie, Ind.

### New Packard Power Plant Addition in Service.

The Packard Motor Car Company, of Detroit, Mich., on last Friday night started their new 4,000 horse power steam engine, and celebrated the event by a dinner given in the engine room to about thirty executives of the Packard Company, the installing engineers and Packard engineers. The company's power plant now comprises



PROBST TRANSMISSION AXLE TESTS.

three engines developing together 6,000 horse power, and work on another addition to the plant has been started. The company is at present working with a night shift of 1,000 men, and when the new engine was started and the old one cut out the former had to take up at once the entire load of the factory.

### Simplex Motor Car Company Elects Officers.

The Simplex Motor Car Company, of Mishawaka, Ind., held its annual meeting on October 1 and elected the following officers for the ensuing year: T. C. Starrett (Detroit) president; R. E. Kamm, vice president; D. A. Shaw, treasurer, and E. G. Gulick, secretary and general manager. The company is at present building an addition to its plant, and is said to be in a flourishing condition.

### Order for Massachusetts Number Plates.

The Massachusetts State Highway Commission has awarded a contract for supplying 52,700 number plates. Under the new law automobiles are registered annually, and the number plates are to be changed each year. The design of the plate for 1910 will be the same as the present year, except that the color will be reversed. Next year the background will be of white enamel, and the letters and figures will be of blue. This year the figures are white with blue background. The registrations commence December 1, and the commission has made it a condition of the contract that at least 10,000 number plates must be delivered at that date. After that the contractor can supply 5,000 monthly until the whole number is furnished.

The order calls for 24,000 pairs of regular plates attached to the ordinary machine, two for each machine; also 475 sets of ten

plates each for dealers. These are to be numbered from 1 to 475, and in each case the figure is to be preceded by an "o." Ten plates are allowed each dealer. The third class number plates are those prepared for the diplomatic corps at Washington, who may be spending the season next summer in Massachusetts. There are about twenty of these plates.

#### Wisconsin Registrations.

Wisconsin's registrations will, without doubt, reach the 10,000 mark by January 1, 1910, according to present figures. On October 1, 9,423 automobiles had been granted licenses, or nearly 3.400 since January I. 1909. The registration law went into effect on August 15, 1905, and in the year following 3,853 cars were registered. December 31, 1908, showed 6,192 cars registered. Secretary of State Frear figures the total investment at more than \$12,500,000. Milwaukee's share in the registration is 3,850. About II per cent. of all automobiles so far registered are owned by farmers. A majority of cars are listed at from \$1,100 to \$1,400.

### Results of Kansas City Endurance Contest.

An endurance contest from Kansas City to Omaha, Neb., and back was conducted last week by the Kansas City Star. The contest was run in five days over a distance of 760 miles, and there were forty-nine contestants. The latter were divided into two classes—one for private owners and the other for dealers. In the owners' class D. E. Gudgell, who drove a Franklin runabout, was the winner, he being penalized only two points for adjustments to minor parts. The dealers' class was won by R. C. Greenlease in a Cadillac "30," which was penalized only one-tenth of a point on examination. The contest may be held annually in the future.



#### Two Cycle Engines.

Editor Horseless Age:

Will you kindly tell me, either directly or through your inquiry column, why the four cycle engine has been so generally used in automobiles, to the exclusion of the simpler two cycle engine?

What are the objections to the two cycle engine?

I make these inquiries because I am asked to interest myself in the manufacture of a car having a two cycle engine.

V. M. M.

One of the chief reasons why the four cycle motor is used for automobiles much more extensively than the two cycle motor is that the former was developed as a high speed motor much earlier than the latter. Some of the early American automobile builders attempted to use the two cycle marine motors then on the market, but found them to be much too heavy for the purpose. As Daimler, Panhard and others abroad had scored all their successes in the automobile line with four cycle motors, American inventors and engineers followed their lead and directed their efforts to the perfection of the four cycle motor.

One other reason why the two cycle motor has not been taken up more generally is that its experimental development offers considerably more difficulty than that of a four cycle motor. In all gasoline motors very much depends upon the sizes and the timing of the valves or ports. In a four cycle motor, if you do not hit it right the first time, you can change the lift of the valves or vary their timing as much as desired by simply making a new cam shaft. In a two cycle motor, however, you must discard the whole cylinder and alter your pattern so as to change the port location, which is, of course, much more expensive. Then, again, it is much more difficult to proportionately enlarge a two cycle cylinder than a four cycle cylinder. That is to say, if you have once developed a good four cylinder motor of, say, 4 inch bore and 5 inch stroke, it is easy to figure from it the proper valve diameter, valve lift, etc., of a motor of different cylinder dimensions. But it is by no means so easy to determine the proper port dimensions of a two cycle motor from the dimensions of the same kind of motor of different size. In fact we know of instances where companies with extensive experience with high speed, two cycle motors of one size "fell down" when they tried to develop a motor of different cylinder dimensions.

The only disadvantage of the two cycle motor in comparison with the four cycle

is that it consumes slightly more fuel per horse power hour. The difference has been set down at about 10 per cent. by some writers. Another thing that may be pointed out in this connection, although whether it may be considered a disadvantage depends upon circumstances, is that the two cycle motor lends itself less to air cooling than the four cycle.

You do not ask about the advantages of the two cycle motor so we will not enumerate them.—En.]

### Denver's Novel Street Traffic Ordinance.

Editor Horseless Age:

The enactment of a law establishing the right of way for vehicles at street intersections is both new and important. Laws have been passed covering almost every situation or condition arising in vehicle traffic except where two or more vehicles meet at street intersections, and this situation seems to have been generally overlooked. Denver, Col., with one automobile to every eighty of its population, is the first city to realize the necessity for such a rule of the road, and has accordingly enacted an ordinance defining the rights of vehicles at street intersections.

Section 1703 of Ordinance No. 124, covering this point, reads as follows:

"It shall be the duty of every person driving any vehicle, when approaching any intersecting street, alley or public way, to halt or slow up and allow any other vehicle approaching along the intersecting street, on the right, to have the right of way."

In addition to the above mentioned excellent rule, this Ordinance No. 124 requires an overtaken vehicle to turn out to the right when signaled to do so by a vehicle approaching from behind. Also, in common with New York, Boston and Chicago, all slow moving vehicles must keep close to the right hand curb to allow room for the passage of faster moving vehicles on the left.

LEWIS SEARING.

[We would point out in this connection that Mr. Searing has been championing the above mentioned rule concerning the crossing of street intersections in our columns and elsewhere.—Ep.]

#### Vehicle Springs.

Editor Horseless Age:

In your issue of October 6 I note with much interest an article by Frederick Strickland on "Shock Absorbers." Although I do not agree with him in several details, yet in a general way his conclusions in several respects, especially as to the action and results of so called "shock absorbers," agree with my experience.

Regarding his conclusion that a car cannot be perfectly sprung (and I assume he means practically satisfactory) I must differ with him, as I have "sprung" two cars with much shorter springs than standard, and they practically accomplish the result which Mr. Strickland indicates is im-

possible. I enclose you a copy of a patent lately granted on such a spring suspension, which I have decided to designate the floating spring suspension. I expect in the near future to apply for a trademark for this designation, and also enclose you a name plate designed with this purpose in view.

Mr. Strickland also states "that if springs could be made with enough internal friction no shock absorbers would be required." I think I have again anticipated him as per enclosed patent for a "wire spring" which has many other advantages, as briefly explained in the history of the patent itself.

Chas. A. Lieb.

[Mr. Lieb encloses us copies of patents Nos. 922,169 and 933,997. The latter covers an arrangement of quarter elliptic springs extending from the vehicle body at an angle of about 45 degrees downward to the axle. This spring system has already been described in these columns. The other patent relates to a wire spring. The specification describes the principle of this spring substantially as follows:

"It is not generally known why leaf springs, so called, are employed in the construction of automobiles, to the exclusion of spiral springs. The principal reason is that as the vehicle, when moving rapidly, encounters obstructions in the roadbed, the wheels and the chassis or body move differently. The former, being light, under the impulse of the springs take immediate cognizance of any irregularity in the road, whereas the body or chassis, having greater inertia, maintains its former position more continuously until the action of the springs under the influence of the inequalities in the roadbed induces a vibrating or oscillating action between the parts involved, which in the event of a succession of irregularities in the roadbed generates so much movement as to tend to rupture some parts of the structure, and also to unseat the passengers. In order, therefore, to control such continued vibration or oscillation, the leaf springs are preferred to spiral springs, because of the friction between the several leaves of the springs which acts as a brake upon their action, having to a degree the same effect as shock absorbers on automobiles, their operation being the same as the friction generated between the leaves of the spring; that is to say they impede or rather render sluggish the resiliency of the metal, which would otherwise be so pronounced as to produce objectionable results, as stated above. For the above reasons leaf springs are the form most universally used. In making these springs it has been customary to roll bar steel into a flattened or ribbon-like form, which is then cut into proper lengths for the individual leaves of the springs, and then additionally rolled so as to reduce the thickness of the ends. This process of repeatedly rolling the metal changes its atomic structure, because the metal which is upon the edges of the leaves has necessarily to move more than the

metal constituting the central portions of the leaves. Consequently the atomic structure at the edges is different from that of the central portion, and this lack of uniformity endenders crystallization when the springs are in use, resulting ultimately in fracture, bending or other defects.

"My invention, therefore, consists in a new and useful method in which to construct the leaves of such springs whereby I preserve the desired frictional contact between the several leaves, and indeed increase the same, and at the same time avoid the objections resulting from repeated rolling of the metal.

Under the preferred form of my invention I make the leaves of the springs from a series of bars placed side by side, and in order that they may be rigidly held in position so that their ends shall not become displaced, I prefer to deflect them at their central portions, as illustrated, and I also use this same method at one end of the springs when my invention is employed in so called quarter elliptic springs. I also prefer to so roll the metal that there shall be interlocking surfaces between the several bars whereby the friction is increased in addition to the additional surface thus obtained because of the wedge shape of the contracting parts of adjacent leaves." —ED.]

#### Auto Statistics.

Editor Horseless Age:

I would like some statistics of the automobile industry, and presume you are able to furnish the following information better than anyone:

- I. The number and estimated value of machines now in use in the United States.
- 2. Number of new machines made this year, and estimated value.
- 3. Number and value of machines likely to be made next year.

The number and value of machines made in France, Germany, Great Britain and Italy this year, the estimates for next year, and the total number of machines in use in the countries named.

ROBERT FULLERTON.

[The number of cars in use in the United States at the present time is about 200,000. and their original cost averaged probably \$1,000, making an aggregate of \$200,000.-000. This year about 82,000 machines were built, and their value also averaged around \$1,000. It should be understood that no actual census of automobile production has been made, but the trade organizations keep records of the production of their own members, and make estimates of the production of the other makers, and the above figures are based on their results. As to the number of cars that will be built next year it is idle to speculate. The automobile industry is rapidly expanding at present, but this expansion may, of course, be checked at any time through unforeseen contingencies. same applies to the production of the different foreign countries for next year. The production of cars in foreign countries the past year was about as follows: France, 25,000; England, 20,000; Germany, 7,000; Italy, 5,000. There are at present in use in England about 100,000; France, 44,700; Germany, 20,000; Italy, 10,000.—ED.]

### Magneto Ignition Matters. Editor Horseless Age:

On page 361, of No. 14, Volume 24, you make a statement to the effect that "very few magnetos are so adjusted as to run their cars on the high gear at a sufficiently low speed to make driving safe in crowded traffic or over very rough level roads. The battery systems of such cars usually provide a very much lower minimum speed. In order to drive on the magneto under such conditions, the clutch requires to be almost constantly slipped, and there is thus a good deal of unnecessary wear and tear thereon. An operator will often resort to clutch slipping, and even change to a lower gear, rather than reach down to the dash and change from magneto to the battery and coil system."

We think it very strange that such a broad statement should be published at this stage of the development of the magneto. You are surely aware that one of the first requirements of a high grade magneto is that it fulfills exactly the conditions which, according to your article, it does not fulfill. If the situation was really as your article would indicate, it is quite evident that the magneto is not the success which popular opinion and experience would indicate. No doubt there are many magnetos which act as Mr. Clough states. On the other hand it is not at all fair to the better grade of magnetos that such a statement should go unchallenged.

We are importers of high tension magnetos, and owing to our extensive experience with magnetos know pretty well of what we speak, and when we say that a high tension magneto can be installed on a modern car to run it at the very lowest speed of which the engine is capable of turning over, we think such a statement should carry weight.

When calling on the factories as a salesman it is the writer's business to install magnetos on test cars, which are then subjected to every possible form of abuse which a car or magneto would experience in actual service. Needless to say, driving on the high gear at a very low speed, not only on the level but up grade, is one of the first tests which a magneto receives. The writer can recall distinctly many occasions when such tests were made at different factories, and in every case the magneto fulfilled the particular conditions referred to perfectly.

Assuming such to be the case, it is hardly likely that the automobile manufacturer would deliver his car with the magneto improperly timed, so as not to fulfill these conditions. We are inclined to think that your contributor's experience was confined to magnetos of a lower grade, and in jus-

tice to instruments of high quality we protest against the automobile public receiving the impression that magneto ignition is unsatisfactory for city work.

Naturally such a statement appearing in your columns carries considerable weight, and we have already had occasion to discuss this matter with several individuals, who noticed the article now referred to, and who, not having personal experience in the matter, are naturally inclined to believe what they read in your columns.

We also take occasion to disagree with a statement on page 378 of the same issue, wherein you say: "Those who are familiar with high tension magnetos know that in these magnetos the current is produced in the secondary winding on the armature by short circuiting the primary winding, and thus decreasing the lines of magnetic force passing through the secondary coil."

The facts are quite to the contrary, it being well known that when the circuit of the primary winding is quickly opened or broken, the high tension current is produced, the primary winding being normally short circuited. Furthermore, in the comparison being made between high tension magneto and the apparatus being described, the action of the rotating primary and secondary windings in producing the arc flame is not referred to, which is hardly a fair comparison.

We trust that you will take these criticisms in the spirit in which they are intended, but we believe that as the automobile public knows all too little about magnetos and magneto ignition, too much care cannot be exercised in having the public get correct information.

#### J. S. Bretz Company. Geo. W. Wacker.

[The magneto handled by our correspondents, and to which reference is evidently had, is provided with a special spring mechanism by which the strength of the spark is rendered independent of the motor speed below a certain point. This is the only magneto we know of that has such a provision, and it is therefore in a class by itself in this respect.—ED.]

At a recent meeting of the A. C. of France the secretary was instructed to canvass the manufacturers for entries for the Grand Prix race in 1910. If a sufficient number of entries are pledged the race will be held again, and it has been decided that there will be no limitation on the construction of the cars.

The taxicab drivers of Brussels, Belgium, went on strike on September 1, owing to disagreement over wages and also because the company attempted to hold them responsible for damages to the vehicles alleged to be due to faults of the drivers. The strikers, who number about 150, held several meetings and sent a delegation to the company in order to reach an agreement. The latter, however, were not willing to enter into negotiations.

#### Commercial Applications.



#### Commercial Notes.

A 40 horse power American automobile truck has been placed in service by the Joannes Company, wholesalers, at Green Bay, Wis.

A new automobile service for a passenger line was started in Madagascar, between Tananarive and Maevatanana, a distance of 215 miles.

The Houston Light and Power Company, recognizing the necessity of getting a repair man quickly to a scene of trouble, have purchased two motorcycles for their troublemen.

The Horace Wood Transfer Company, 45 Monument place, Indianapolis, Ind., have ordered two Marmon five passenger limousines, to be used in connection with their present horse livery.

The water department of the city of Milwaukee, Wis., will be supplied with an automobile costing \$2,500 if the recommendation of the committee on water works is adopted by the council.

Forsythe Brothers, of Washington, Pa., have established an automobile service between Washington and Brownsville, with one 40 horse power Grabowsky car. The firm does business under the style of the Washington and Brownsville Auto Passenger Transit Company.

Louis G. Deschler, an Indianapolis wholesale cigar dealer, has just placed his third motor delivery wagon in service, now doing all of his city delivery work with such vehicles. Hamilton & Harris and the House of Crane, also wholesale cigar dealers, also do all of their city delivery with automobiles.

A 1910 Mitchell roadster has been presented to the chief of the Racine, Wis., fire department by Capt. William Mitchell Lewis, president of the Mitchell Motor Car Company. Mayor A. J. Horlick, of Racine, several months ago made the gift of a 1909 Mitchell roadster to the city for use of the chief of police on condition that the council purchase a similar machine for the fire marshal.

Automobiles, which have always played a prominent part in municipal campaigns of Indianapolis, are cutting very little figure in the present campaign. One reason is that the majority of the candidates are men who cannot afford automobiles. Only one of the four candidates for mayor has an automobile in the present campaign, and only one or two candidates for the council have such vehicles.

The Indianapolis board of health has purchased an automobile equipped with a detachable tonneau for the use of its dairy inspectors who travel over the State inspecting all dairies supplying milk to Indianapolis consumers. Heretofore the inspectors have used horse drawn vehicles

and electric interurban lines, and they expect to accomplish twice as much work in a day as with their former transportation facilities.

A regular automobile service has been established between Fredericktown, Md., and Washington, D. C., the route leading through Brownsville, Centerville, Beallsville, Scenery Hill, Glyde and Pancake. The distance is 30 miles, four-fifths of which lies over the old national highway. Two round trips will be made per day with a 45 horse power, twelve passenger car of the closed type, heated and electrically lighted.

#### The National Highway from New York to Atlanta.

After a thorough inspection of the various routes between New York and Atlanta, the route for the "National Highway" between the two cities has been definitely selected. Starting on the 25th of this month the first public tour between North and South will be held over this route. More than twenty entries have already been received, and the event will be one of the most important of the season. During the summer a 30 horse power White steamer made three trips between New York and Atlanta, over as many different routes, and with the aid of the data thus obtained the official route has just been marked out by two White cars. A White steamer started from New York on September 23, and reached Atlanta on September 30. A White gasoline car started northward from Atlanta, and the two machines met at Martinsville, Va., and from that point proceeded southward together.

The route of the New York-Atlanta national highway leads across Staten Island, thence to Trenton, crosses the Delaware River at that point, and thence proceeds to Philadelphia. From Philadelphia the route leads almost due westward to Gettysburg, via Lancaster and York. At Gettysburg the route turns southward to Hagerstown, thence to Shepherdstown, W. Va., and from there to Winchester. From this point the route follows the famous Shenandoah Valley Pike to Staunton. From Staunton the route proceeds southward via National Bridge to Roanoke. South of Roanoke is a stretch of about 50 miles across the mountains where the worst roads of the entire route are encountered. As soon as the highway enters North Carolina better conditions are found, and there are good roads almost all the way across the State, via Winston-Salem, Greensboro and Charlotte. Greenville and Anderson are the principal towns in South Carolina through which the route passes, and entering Georgia the route proceeds via Royston, Winder and Lawrenceville to Atlanta, the total distance from New York being 1,050 miles.

#### Representatives of the Mitchell Car in California.

James W. Gilson, sales manager of the Mitchell Motor Car Company, of Racine, Wis., recently visited the Pacific Coast, and appointed the Osen & Hunter Automobile Company the northern California representatives of the Mitchell car, agents for the whole Pacific Coast, including California, Oregon, Washington and Idaho. A. E. Hunter becomes the general Pacific Coast superintendent, the Northwestern territory being under the direct control of George E. Johnson, now Pacific Coast manager of the Fisk Rubber Company.

Johnson's headquarters will be at Seattle, Wash. Hunter was originally established in San José, Cal., but went to San Francisco in 1907, and started an auto business there.



ROUTE OF NEW YORK-ATLANTA HIGHWAY.



### Claiming Damages for Injury from Road Obstructions.

Another claim for damages as the result of obstructions on highways has been filed under the new Wisconsin law making it a felony for a person to place obstructions on the road, and requiring highway superintendents to remove them on notice. Mrs. Margaret Christianson, of Manitowoc, Wis., struck an obstruction on one of the main streets of Manitowoc, and filed claim for \$1,000 personal damages, and \$1,505 damages to her automobile. Unless the claim is paid she has the privilege of bringing suit against the municipality. The first suit under this law is that by James T. Drought. of Milwaukee, who is secretary of the Wisconsin State A. A., as a private owner, for damages to his car while passing through Winnebago County, Wis. The outcome of these cases is being watched with great interest by owners, and since the claims were filed there has been a noticeable decrease in obstructions.

### Suit to Get Possession of Speedway Trophy.

The Jackson Automobile Company has filed suit in the county courts at Indianapolis to mandate the Indianapolis Motor Speedway Company to deliver to it the Wheeler & Schebler trophy. This was to have been the prize in a 300 mile race in the events at the speedway in August. Because of numerous accidents the race was called off, with Lynch driving a Jackson leading and having covered 235 miles. The company filed suit some time ago to obtain possession of the cup and demanding \$100,000 damages.

#### Tire Thief Sentenced.

A sentence of six months in the House of Correction, with the alternative of a fine of \$100, was imposed on Orlando Snedecker, of Chicago, in the Municipal Court at Milwaukee, Wis., on conviction of the charge of stealing spare casings and tires from automobiles left on streets by owners. Snedecker paid the fine. He owns a small repair shop at Chicago, and shipped the stolen casings and tires to Chicago by a circuitous route to avoid suspicion. His arrest cleared up many mysterious losses.

### Chicago Ordinance Limiting Curb Standing Privileges.

The Chicago City Council has passed an ordinance which prohibits vehicles being left standing on the streets unattended for more than an hour within the Loop district. The new ordinance relates to both automobile and horse vehicles.

### Lamps Must Burn While Car Is at Rest.

In an opinion recently handed down by Attorney General Denman, of Ohio, manufacturers of electrical lighting apparatus for automobiles will have to provide storage batteries to furnish the current while the car is standing if they wish to make their invention a success. A certain manufacturer desired to know what the meaning of Section to of the Ohio automobile law was, and the matter was referred to Attorney General Denman. He held that the law provided that three white lights must be displayed whether the car was moving or standing while on a public highway. The manufacturer desired to furnish light by a current generated by the drive shaft of the car.

### Ohio Motorists Threatened With Increased Fees.

Representative Owen J. Evans, of Stark County, announces that he has prepared a bill to be introduced in the next session of the Ohio General Assembly, providing for a large increase in the fees paid for registering motor cars. He believes that the fees as provided at present are not sufficient, and his schedule will more than double the receipts of the State Automobile Department. Considerable opposition to the proposed law has appeared already.

### Bar Harbor Exclusion Act Sustained.

The Law Court, the highest court of appeal in Maine, handed down a decision on October 2 in the Bar Harbor automobile controversy, sustaining the constitutionality of the ordinance which prohibits the use of automobiles on the roads of that resort.

#### Legal Notes.

F. W. Miller, of Milwaukee, Wis., was fined \$50 and costs for using the automobile of A. J. Monday, of Milwaukee, an expert automobile painter and repair man, without the owner's permission. This was the second and heaviest fine imposed under the new Wisconsin law aimed at this evil.

The Toronto, Ont., city council is considering the plan of having the name and coat of arms of the city painted on all municipal automobiles. Some of the city officials who are making use of these cars, including City Engineer Rust, are strongly opposed to the proposal, but, according to a Toronto paper, there are good and sufficient reasons for it.

At the hearing on the new garage ordinance before the Buffalo, N. Y., city council, to which reference was made in our last week's issue, several property owners claimed that the erection of a garage in a certain residence district would depreciate the residential property there. The committee referred the ordinance to the corporation counsel, to be redrafted so as to provide

for a permit or license without fee, and to require the consent of abutting owners.

An effort is being made in the State of Washington to prevent road house owners from selling intoxicating drinks to chauffeurs. The county commissioners of Pierce County have been requested to make a ruling which will have this result, and fewer accidents and smaller repair bills are expected to result if favorable action is taken by the commissioners.

#### Protests in Munsey Tour.

Leo H. Shaab, of Baltimore, Md., has made a protest against the award of the sweepstakes prize in the Munsey reliability tour to the Elmore car. Another protest against the action of the technical committee has been made by the entrants of the Marmon car, which is claimed to have been in collision with the Elmore as the machines entered Washington. Shaab's protest is based partly on this accident, which is alleged to have been due to a defect in the brakes on the Elmore, and he further alleges that there was a perceptible dish in one of the front wheels, which the committee apparently overlooked.

#### Garage Fires.

Three cars were destroyed in a fire which occurred in the garage of the Automobile Exchange and Supply Company, 18 Sabin street, Providence, R. I., on October 1. The establishment is conducted by Charles H. Goodwin. The cause of the blaze is unknown.

A fire which broke out in the Montauk Garage, 910 Union street, Brooklyn, N. Y., on October 8, resulted in the destruction of over thirty automobiles. The fire is thought to have been caused by the accidental ignition of gasoline used in cleaning the cars. The garage is located adjacent to the headquarters of the Long Island A. C.

A fire broke out in a two story brick building in the rear of 1575 Beacon street, Brookline, Mass., on October 5, which entirely destroyed the building and its contents, including a \$4,200 car. The building was occupied as a garage by James S. Murphy, and the fire is said to have been caused by the light of a gas stove igniting gasoline fumes. The accident illustrates the danger involved in any attempt to heat a garage by means of ordinary stoyes.

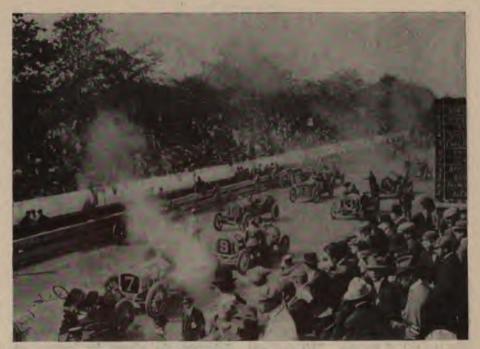
Five automobiles, valued at \$5.00, and other property to the amount of \$6.500 mere destroyed by a fire which started in the repair shop of the G. W. Browne Motor Company, 228 Wisconsin street, Milwandee, Wis., on October 3. A repair men was working on a car with the aid of an extension light, when in some way the wires became short circuited and the marking flash ignited the fumes of a bucket of another standing nearby. Six of the cars in the garage were saved by the garage employees and others with considerable risk to themselves.

#### The Fairmount Park 200 Mile Stock Chassis Race.

The second annual running of this event, which took place Saturday, October 9, can unreservedly be said to have been a great success in every way, and much credit is due not only to the officials of the Quaker City Motor Club but to the city officials of Philadelphia, who lent their hearty cooperation by detailing 1,800 regular police, as well as the Fairmount Park Guards. It was stated that some 17 miles of rope was used to keep the spectators in check. Ambulances were placed at various points along the course, and besides various physicians who had come out to see the race flew Red Cross flags from their parked cars.

The sportsmanlike spirit shown by private owners and the local trade in entering cars despite the handicap of not having experienced racing crews did much to add interest to the race, and in many cases the performance of these cars, considered by themselves, was most meritorious. That the co-operation of the authorities with the club officials was thoroughly appreciated was shown by the disqualification of one of the entrants for an infraction of the park rules.

The course, which is located in Fairmount Park on the west bank of the Schuylkill, is peculiarly well fitted to bring out not only all desirable qualities in a car but also the skill of the driver. That portion of the course which includes City Line and Neill Drive is quite hilly and abounds in turns, while that portion from Sweet Briar Hill along the river affords a good opportunity to drive the cars to their limit. In short it would be difficult to find anywhere a course of equal length that would offer the same variety of conditions necessary to a thorough test of the qualities of a car that this



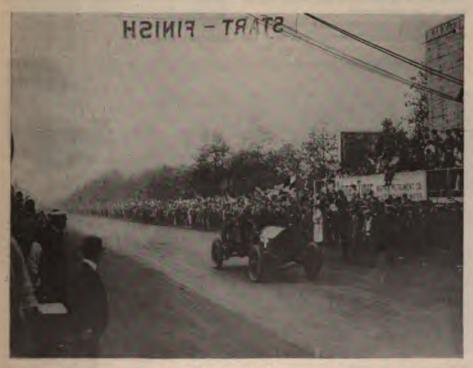
GENERAL VIEW IN FRONT OF GRAND STAND.

does, one so easily accessible and so easy to police.

On the morning of the race all of the twenty-two starters were on hand. Just before the race, however, Grant, who was to drive the Alco car, No. 11, discovered a slight imperfection in the steering gear. While a repair could easily have been made, Grant was inclined to err on the side of prudence and decided not to start. This was particularly unfortunate, as this car was looked on by many as at least a possible winner. A rather remarkable feature of this race was the large proportion of six cylinder cars entered, there being eight to a total of twenty-two.

Promptly at 12 o'clock the first car was sent away by the starter, and the others followed at fifteen second intervals.

The first trouble occurred to the Selden car. No. 23, which smashed a rear wheel at Sweet Briar Hill when hardly out of sight of the grand stand. A new wheel was fitted, and the car was running again after a delay of twenty minutes, and it was still going at the end of the race. Although on account of its number (23) this car furnished considerable merriment to the spectators, its performance was by no means bad, especially when it is considered that it was one of the lowest powered cars in the race. The Lozier also came to grief in this lap. A broken water connection caused a loss of the cooling water, and was not discovered until too late to effect a repair. In the meantime No. 2, American, had passed No. 1, Simplex, but was closely followed by No. 4 Simplex, which had passed No. 2 and 3 at the end of the first lap. Buick No. 13 had moved up to sixth position, and in point of time was in the lead. This time lead was maintained until the fourth lap, which was then gained by Simplex No. 4, and maintained until the end of the race. At this point Chevrolet, the driver of No. 13, was reported to be delayed by engine trouble, and although he made a splendid fight to regain his lost position he was forced to withdraw in the twelfth round on account of a broken exhaust valve. In the meantime, however, Columbia No. 14 and Welch No. 20 had withdrawn in the third round. One of the most interesting features of the race was a three cornered battle between Chadwicks Nos. 16 and 18, and the Isotta No. 17. At first No. 16 had the best of it, and had a lead of eight minutes or so. In fact, this car made the fastest time for a lap in the race, this lap being made in 7 minutes 41 seconds. In the fourteenth lap its lead was



ROBERTSON (SIMPLEX) FINISHING.



DINGLEY ON CHALMERS-DETROIT, SECOND IN RACE, ON HOME STRETCH.

decreased, and it finally dropped out owing to lack of cooling water. No. 18 had been keeping at it with surprising regularity; it had been passed by No. 17 a number of times, but in the nineteenth lap it finally passed the Isotta, and maintained the lead until the end of the race. This duel was rather interesting in view of the relative weights and horse powers of the two cars, and the comparative skill of the drivers, the Chadwick being higher powered and heavier than the Isotta, and on the other band the Isotta was equipped with a four speed gear, and driven by Strang, a man who thoroughly understands the use of the same. A remarkable feature of the race was the large number of cars still running at the end, there being three cars running when the race was declared off, besides those which officially finished.

One of the features of Robertson's performance on the winning Simplex No. 4 was the extreme regularity of running. Barring the first lap, and the one on which he took on supplies, the variation from lap to lap was a matter of hardly more than eight to ten seconds. Another feature of his driving was his extreme caution in taking corners, the brake being applied so that at the turn he was moving with comparative slowness. Just before rounding a turn he would change to a lower gear and try to save time by rapid acceleration after making the turn rather than by taking chances in rounding the turn at too high a speed. This seemed to be the method used by all drivers who finished.

As far as could be ascertained there were only two accidents of anything like a serious nature on the course. The Acme No. 7 on its seventh round cast a tire while approaching the grand stand. This rolled along the ground, and bounded over the supply pit into the grand stand, striking a thirteen year old boy and stunning him. A machine with a surgeon was rushed to the spot, and the boy was carried to a hospital tent. Fortunately he was not badly injured; some time later he returned to his seat and enjoyed the finish of the race. Hayes, driving American No. 12, and Mechanician Johnson struck a telegraph pole on Sweet Briar Hill, and both were

thrown. Hayes was not injured, but Johnson was rendered unconscious. After being placed in the ambulance he soon recovered and helped Hayes repair the car.

One fact that was rather remarkable was the almost entire absence of tire trouble, Robertson, the winner, for instance, was entirely free from it, and only changed his tires as a precautionary measure while taking on supplies. The five cars which officially finished were:

First-Robertson, No. 4, Simplex; time, 3h. 38m. 58s.

Second-Dingley, No. 5, Chalmers-Detroit; time, 3h. 44m. 30s.

Third-Harding, No. 8, Apperson; time, 3h. 52m. 17s.

Fourth-Parkin, No. 18, Chadwick; time, 3h, 55m. 31s.

Fifth-Strang, No. 17, Isotta; time, 3h. 56m. 54s.

Besides these No. 10, Palmer-Singer, was on its last lap when the race was declared off, while No. 3, Benz, was still running, being on its twenty-third lap, while No. 23 was on its seventeenth.

The electric automatic timer made by the Warner Instrument Company was used for the time at a road race. The three leading cars were equipped with Michelin tires.

After the race an informal smoker was given by the Quaker City Automobile Club to the contestants, officials and other participants, to which various city officials and the press were also invited. Speeches were made by the mayor and the chief of police, as well as by the winning contestants. The proceeds from the race will be devoted to charity, among the beneficiaries being the Children's Aid Society of Pennsylvania; Pennsylvania Society for the Prevention of Tuberculosis, Rush Hospital, Free Hospital for Poor Consumptives and the White Haven Sanitarium.

At a meeting of the contest committee of the Quaker City Motor Club on Monday of this week, the Chalmers-Detroit car was awarded the consistency prize, and Bert Dingley, its driver, the Stetson prize of \$100 in gold. Len Zengle, who made the fastest lap in a Chadwick car in 7 minutes 41 seconds, will be presented with a gold watch for the feat. George Robertson (Simplex), the winner of the race, will receive \$2,500 in gold and the MacDonald & Campbell \$1,000 cup. All of the prizes are to be presented at Keith's Theatre on Thursday night in the presence of State and city officials.

#### A. A. A. Contest Board Acts on Protests and Issues Suspensions.

The contest board of the American Automobile Association met at the Engineers' Club, New York city, October 5 and 6, with the full board present, to consider the various protests on file.

The first protests before the board were those of H. O. Smith and W. H. Vandervoort, entrants of the Premier and Moline cars, respectively, against the findings of the technical committee on the two Pierce touring cars and the Pierce Runabout No. 108. Messrs. Vandervoort and Smith withdrew their pro-



CHADWICK AND BUICK TURNING INTO HOME STRETCH.



MAP OF RACE.

tests with the consent of all parties in-

The protest of the Jackson Automobile Company on the abandonment of the 300 mile race on August 21 at the Indianapolis Motor Speedway was next taken into consideration. After a full discussion it was "Resolved, that, as Referee S. B. Stevens' action in the matter was done with the consent of the contest board through its representative at the meet, C. W. Sedwick, and in accordance with Rule 53, page 13, of the 1909 Contest Rules, the action of the referee is hereby sustained." And as the Jackson Automobile Company had advertised that it won the 300 mile race at the Indianapolis Motor Speedway on August 21, 1909, despite the referee's decision of no race, and in violation of Rule 55, page 14 of the Contest Rules of 1909, it was further "Resolved, that the Jackson Automobile Company is hereby suspended from entering any contest until January 1, 1910."

After careful consideration of the Chicago Motor Club's request for fixed penalties and other changes for its endurance run it was "Resolved, that a sanction will only be granted under the contest rules adopted June 10, 1909."

In the matter of the Premier Motor Manufacturing Company's protest against the Quaker City Motor Club both parties thereto were represented. The protest was on the penalties imposed for time in checking at controls after the blockade at Giant's Despair Mountain. After a full presentation of the case it was found that the subject hinged on part of the instructions given the contestants by a representative of the club at the instruction meeting, wherein it was stated in substance that, owing to road conditions, if a blockade occurred to a contesting car by reason of a disabled car, the committee would take care of it, This left the matter of making up time or of establishing a new schedule entirely at the discretion of the contestants. and both methods were used after the blockade. In view of these facts it was "Resolved, that the protest of the PremLIST OF ENTRIES.

NO.	Cylinder	Horse	
Car.	. Car. No.	Power. Entrant.	Driver.
T	Simplex 4	90 John F. Betz, 3d	J. F. Betz, 3d
2	American 4	60 American Motor Car Co	Robert Drach
3	Benz 4	60 E. R. Bergdoll	Charles Howard
4	Simplex 4	90 Simplex Auto Co	George Robertson
5	Chalmers-Detroit 4	40 Chalmers Detroit Co	Bert Dingley
6	Thomas 6	70 L. J. Bergdoll	Willie Haupt
7	Acme 6	60 Malin Leniau	Malin Leniau
8	Apperson 4	49.2 Philadelphia Auto Co	Harding
9	Buick 4	30 Buick Motor Car Co	Robert Burman
10	Palmer-Singer 6	60 C. A. Schroeder	William Wallace, Jr.
11	Alco 6	60 W. C. Longstreth	H. F. Grant
12	American 4	50 American Motor Car Co	E. O. Hayes
13	Buick 4	30 Buick Motor Car Co	Louis Chevrolet
14	Columbia 4	32.4 Columbia Motor Car Co	J. O. Coffey
15	Thomas 4	70 L. J. Bergdoll	L. J. Bergdoll
16	Chadwick	60 Chadwick Engine Works	Len Zengle
17	Isotta 4	40 S. S. Thornton	Louis Strang
18	Chadwick 6	60 Chadwick Engine Works	J. Parkins, Jr.
19	Chalmers-Detroit 4	40 Chalmers-Detroit Co	L. N. Lormer
20	Welch 6	70 E. R. Bergdoll	E. R. Bergdoll
22	Lozier 6	50 Lozier Motor Car Co	Seymour
23	Selden 4	36 F. E. Dyer	Charles Young

ier Motor Manufacturing Company be sustained."

Relative to the appeal of the Dayton Motor Car Company in the hill climb contest of the Automobile Club of Cincinnati two protests were entered against awarding the first prize to the Stoddard-Dayton car on the ground that the car was not a stock car in the meaning of the definition in the contest rules, and the referee decided in favor of the appellants. From the evidence submitted by the makers of the car the referee's decision was sustained by the contest board.

On the report of the referee of the Brighton Beach races of August 27, and of a member of the contest board present, the entrant and driver of S. P. O. Car No. 1 were each suspended to January 1, 1910, and the driver fined \$100 and suspended until the fine is paid.

#### N. A. A. M. Meeting.

The regular monthly meeting of the executive committee of the National Association of Automobile Manufacturers, Inc., held at the association's office on October 6, was attended by Messrs. W. E. Metzger, in the chair, Thomas Henderson, A. L. Pope, L. H. Kittridge, H. O. Smith, S. T. Davis, Jr., W. T. White, W. M. Lewis, C. G. Stoddard, Charles Clifton, W. R. Innis, Benjamin Briscoe, R. D. Chapin and S. A. Miles.

The membership of the Electric Vehicle Company was transferred to the Columbia Motor Car Company, represented by H. W. Nuckels. The membership of the Royal Motor Car Company was transferred to the Ropal Tourist Motor Company, represented by George J. Dunham. Frank Briscoe, representing the Brush Runabout Company; W. C. Johnson, representing the Waverley Company; W. H. Van Devoort, representing the Moline Automobile Company; R. H. Salmons, representing the Selden Motor Vehicle Company, and W. S. Austin, representing the Austin Automobile Company, were elected to membership.

The question of the advisability of amending the standard warranty was referred to a special committee.



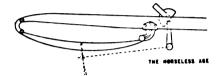
HARDING (APPERSON), WHO FINISHED THIRD.

# OUR FOREIGN EXCHANGES ➤



#### A Novel Front Spring Arrangement.

In the majority of cars fitted with semielliptic front springs the springs are pivoted at the forward end to spring horns secured to the frame side members, and at the rear are shackled to spring brackets riveted to the frame. This arrangement has one rather serious disadvantage, in that the play of the springs considerably influences the steering action. The axle being rigidly secured to the spring, when the latter compresses



DE DION FRONT SPRING DESIGN AVOIDING STRAIN ON STEERING GEAR.

and expands the axle moves in a circle around the pivot point of the spring horn as a centre. The steering rod, on the other hand, moves in a circle around the ball end of the steering arm and the two circles diverge considerably.

The above difficulty has been overcome in the latest De Dion small, four cylinder cars, in which the front springs are pivoted to the spring brackets and shackled to the frame at their forward end, as shown in the accompanying sketch. The centres of motion of the axle and of the forward end of the steering rod are then substantially the same, whereby the strains and abnormal wear, due to the differentiation in the radial movement of these parts are eliminated.

#### Chauffeurs and Their Masters.

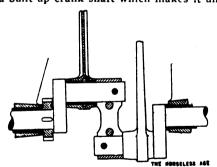
There are many thoroughly good paid drivers in the motor world. By good we mean honest, capable men who are properly qualified for their work. It is equally true there are a large number of incapable paid drivers, whose qualifications are very scanty, and who in one way or another are quite unfitted for the work, and very often their only recommendation is that they are cheap. On the other hand, there are all grades of employers, from the reasonable and considerate man to the unreasonable and suspicious individual that no man, whether he be honest and capable or dishonest and incapable, can satisfy.

There is no doubt that the grumbles on the part of the employers and on the part of the men are often real, and the grievances that both classes detail are not all imaginary. After all, a man can only speak from his own experience. If an employer has never succeeded in getting a good chauffeur he is apt to conclude that all chauffeurs are hopeless, and the chauffeurs in their turn who are unlucky in their masters arrive at the conclusion that reasonable employers exist only in story books.

We are glad to say that in the course of our motoring experience we have come across many motorists and men who have thoroughly understood each other, and whose relationship has been of a satisfactory nature, both to employer and employed. The difficulties which have arisen have undoubtedly been largely due to ignorance and consequent suspicion and unreasonableness on the part of the employer, and to incapacity and sometimes to downright dishonesty on the part of the employed. Imagine the position of an honest and capable chauffeur, who is engaged by a motor car owner who knows little or nothing about the car, and who has previously employed a man who has been proved to be either dishonest or incapable, or possibly both. Now, such an employer is so ignorant that he does not really know the difference between the good man and the unsatisfactory one, and consequently he fails to appreciatc or to trust either, so that no good man will stop with him longer than he can help. Then, again, there is the employer who knows how a car should be driven and how it should be looked after, but who, somehow or other, never seems to secure the right man. It may be urged that he is unreasonable, but while this is often true, we know in some cases it is not so. These things will right themselves gradually as the ignorant owners learn and as the incapable chauffeurs either mend their ways or turn their attention to other work.-The Autocar

### A Built Up Four Cylinder Crank Shaft.

The new four cylinder, 6-12 horse power light car built by the Adler Works, of Frankfort-on-Main, Germany, a description of which appears in the last issue to hand of *Der Motorwagen*. is provided with a built up crank shaft which makes it un-



ADLER BUILT UP CRANK SHAFT.

necessary to split the big end of the connecting rod.

The motor has a bore of 3 inches and a stroke of about 3½ inches. It will be seen from the accompanying illustration that the long arms of the crank shaft are separate pieces, which are clamped and pinned to extensions of the crank pins. The crank pins are approximately 1¼ inches in diameter, and the connecting rod bearing on the pins is 2 inches long. The part forming the long arm of the crank shaft is bored out at both ends to

receive the extensions of the pins, and is slotted between the bores. After the crank is assembled the long arms are drawn tight on the crank pins by means of two bolts passing through the arms close to the pins, and one pin is passed right through the middle of each crank pin and the surrounding arm. The object of this construction is evidently to save the cost of expensive dies for the crank shafts and the cost of fitting separate connecting rod heads.

### Daimler Motor With Rotating Disc Valves.

The Daimler Motor Company, of Unterturkheim, Germany, have taken out a French patent on a gasoline motor with rotary valves in the cylinder head. This motor is characterized by the fact that the cylinder head forms the seat for one or more rotating disc valves and contains inlet and exhaust ports. The valve discs are also provided with port openings, and are pressed against their seats by the pressure within the cylinder, which, together with the conical form of the seats, insures a gas tight joint. As the temperature in the cylinder is very high, the seats and discs are kept very small in order to prevent warping.

The patent specification shows a number of different constructions. The simplest construction is that in which a single rotating disc is used and the inlet and exhaust ports are arranged at 90 degrees to each other. In order to insure a quicker opening and closing of the ports two valve discs with concentric stems may be used and rotated in opposite directions. In order to insure perfect cooling of the discs the latter may be placed between interior and exterior water cooled walls. It is also possible to provide separate valve discs for the inlet and exhaust, in which case each valve can be timed absolutely independently, but the possible size of the valve ports is then rather limited. The stems of the valves have small gear wheels secured to them at their outer ends and are driven through a gear frame from the crank shaft at one-half the speed of the latter. One of the advantages of the system consists in the positive timing of the valves, and another one consists in their noiseless operation. Whether it is possible to keep these valves tight and to prevent cutting of the discs on their seats is a question only practical experience can solve.

It is reported from Paris that the majority of the executive committee of the A. C. of France are in favor of repeating the Grand Prix race in 1910. According to present plans there would be two races, one for large cars with four cylinder motors up to 30 mm. bore and up to 200 mm. stroke (5.2x8 inches), and one for small cars with four cylinder motors up to 90 mm. (3.6 inch) bore, or six cylinder motors up to 80 mm. (3.2 inch) bore.

### Commercial Test of a Pierce Water Cooled Motor.

At the last meeting of the Society of Automobile Engineers, in Chicago, a paper on the above subject was read by J. A. Luhrman and G. W. Woodward. The objects of the tests were to ascertain the following:

- I. The fuel consumption and the economic thermal efficiency at constant speeds and varied horse power output at various settings of the needle valve in the carburetor.
- 2. Fuel consumption and economic thermal efficiency at the maximum horse power output and varied speeds with respect to the needle valve settings.
- 3. The mechanical efficiency and maximum compression pressures from the manograph cards.
- 4. The fuel consumption for slow no load run.

The engine tested was a six cylinder Pierce engine of 315 inch bore and 434 inch stroke. The two sets of valves are located on opposite sides of the cylinders, and are actuated mechanically by separate cam shafts. It is not necessary to further describe the motor, as it is well known to most of our readers. Tests were made with a Hospitalier manograph and with a Prony brake, and the gasoline used was carefully measured. The gasoline was also analyzed by means of a Junker calorimeter, and was found to have a higher heating value of 19,798 B. T. U. per pound, and a lower heating value of 18,700 B. T. U. per pound. Following are sample computations for run No. 1:

10 horse power at 1,000 r. p. m.

Gasoline consumed in thirty minutes—4320 c. c.

Specific gravity-.705.

Since 4320 c. c. of gasoline were used, and I c. c. = .061 cubic inch, 4320 × .061 = 264 cubic inches were used.

As the hydrometer was calibrated with water at 60° Fahr., and the weight of 1 cubic foot of water at 60° Fahr.=62.37 pounds, the weight of gasoline=cubic inches × specific gravity × weight per cubic foot water + 1728=

$$\frac{264 \times 62.37 \times .705}{1728} = 6.72$$
 pounds.

B. T. U.'s supplied per hour = pounds of gasoline used × lower heating value of gasoline =

$$6.72 \times 2 \times 18700 = 251000.$$

Thermal equivalent of 10 horse power. Horse power  $\times$  2545 = 10.016  $\times$  2545 = 25460. Thermal efficiency =

Pounds of gasoline per 1,000 revolutions of motor = pounds of gasoline used + total revolutions × 1.000 =

$$\frac{6.72 \times 1000}{30050}$$
 = .2235 pound.

The volumetric efficiency from the card was determined by measuring the distance between the points where the compression

MAXIMUM I	JOESE LOME	Æ.		
	Run 1.	Run 2.	Run 3.	Run 4.
Time of run, minutes	15	20	20	15
Net brake scale reading	56.64	52.61	53.77	51.07
Gasoline consumed, cubic inches	154.8	249.2	414.5	258
Setting of needle valve (degree open)	360	360	450	450
Specific gravity of gasoline	.705	.705	.701	. 705
B. T. U. supplied per hour	294,000	356,500	575,000	490,000
Average D. H. P	20.54	25.8	32.58	38.65
Thermal equivalent of horse power	52,300	65,600	82,900	98,400
Thermal efficiency (D. H. P.), per cent	17.8	18.4	14.41	20.08
Total number of revolutions	<b>8,</b> 968	16,172	20,010	20,000
Revolutions per minute	579.87	808.6	1,000.5	1,250
Pounds of gasoline per 1,000 revolutions	-439	.259	.523	. 328
Temperature jacket water, in	111.89	113.7	88.09	89.5
Temperature jacket water, out	138.67	137.5	108.63	108
Temperature range	26.78	23.8	20.54	18.5
Pounds of jacket water per hour	4,608	6,000	7,260	<b>8,</b> 880
Heat loss to water per hour	123,300	142,800	149,100	164,200
Heat loss, per cent	41.9	40	25.95	33 • 5
Volumetric efficiency from card	85	87.50	77.03	94.25
I. H. P	17.85	25.20	29.90	38.25-
Maximum explosion pressure	294.66	251.08	<b>236.</b> 61	235.88

MANIANA HORES POWER

and suction lines cross the atmospheric line, and dividing this distance by the total length of the card. The average volumetric efficiency from the cards of the six cylinders was taken.

The indicated horse power of the engine was found by taking the sum of the indicated horse power of each cylinder.

#### PUMPING LOSSES.

The pumping losses = the difference between the I. H. P. from the indicator card and the B. H. P. =

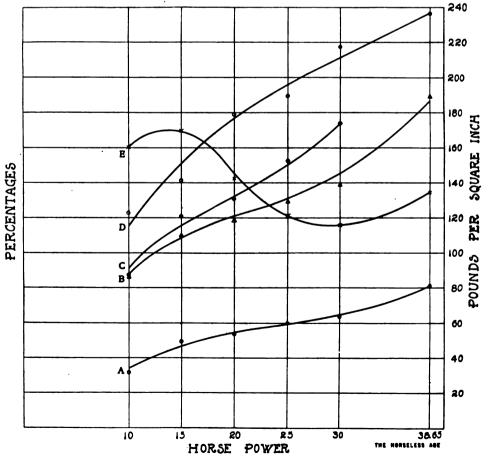
#### 18.75 — 10 = 8.75 H. P. MECHANICAL EFFICIENCY.

The mechanical efficiency is the ratio of

the D. H. P. to the I. H. P., and in this

$$\frac{10}{18.75} = 53.3 \text{ per cent.}$$

The authors of the paper give result sheets for runs at various outputs and speeds of revolution. We reproduce here only the result sheet of runs under maximum power at various speeds, which is undoubtedly the most interesting. We have, however, plotted in the diagram herewith curves showing the variation in the following factors with the horse power at a constant speed of 1,250 r. p. m.: Thermal efficiency, heat loss to jacket in per cent.,



A—Thermal efficiency, B—Volumetric efficiency, C—Mechanical efficiency, D—Explosion pressures, E—Per cent. of jacket loss.

volumetric efficiency from card, mechanical efficiency and maximum explosion pressure. The thermal efficiency will be seen to increase almost directly in proportion to the output. The volumetric efficiency, or the proportion of the cylinder filled, also increases substantially in direct proportion with the output, as does the mechanical efficiency. The percentage of heat loss to the jacket water shows a rather peculiar variation. It is lowest at about 30 horse power. The maximum explosion pressure increases with the horse power in an almost straight line relation, except at the lowest powers.

### Milwaukee Retail Firms Consolidated.

The Kopmeier Motor Car Company, of Milwaukee, Wis., has doubled its capitalization, its capital stock now being \$100,000. It has purchased the garage and business of the Ogden-Farwell Garage, incorporated for \$10,000. A. F. Timme, a well known young business man of Milwaukee, has acquired an interest, and will be general manager of both corporations, which will be operated as distinct companies. The list of officers of both companies is the same, as follows: President, Norman J. Kopmeier; vice president, A. F. Timme; secretary and treasurer, Waldemar S. Kop-The Kopmeier Garage, at 375 Summit avenue, will be distributor for the American and the Detroit electric as in the past, and has added the Velie. The Ogden-Farwell Garage, 82-86 Farwell avenue. takes over the Chalmers-Detroit and Hudson, heretofore handled by the W. L. Hibbard Motor Car Company, 417-421 Wells street, Milwaukee, and will be a subagency for the Detroit electric. Before the change of ownership the Ogden-Farwell Garage handled the Studebaker, E-M-F and allied lines. These have not yet been he-established in Milwaukee. The Hibbard Company is closing out its stock and will retire from the field. W. L. Hibbard retired from the company last July. The Kopmeier Company now controls the two most favored garages on the east side of Milwaukee, and it is said that plans are under way for the acquisition of at least one leading west side garage on upper Grand avenue. It already has a firm foothold in Chicago. Robert Drach is manager of the Chicago branch on Michigan avenue, which handles the American in that territory.

### Ajax Tire Company Increase Capital Stock.

The Ajax-Grieb Rubber Company, of Trenton, N. J., makers of Ajax tires, held their annual meeting last week. The annual dividend was declared, and it was voted to increase the capital from \$400,000 to \$1,000,0000. An election of officers for the ensuing year also took place, and all of the present incumbents were re-elected to the same offices. They are: President, Horace De Lisser; vice president, William

G. Grieb; treasurer, Harry Grieb. With the additional capital the company will be in a position to triple their capacity, and during 1910 they hope to do fully double the business of the present year, which has been the biggest in the history of the company.

### Large Independent Firms Join Licensed Association.

At the meeting of the Association of Licensed Automobile Manufacturers held in New York city on Thursday last, six of the largest outside manufacturers were admitted to membership, namely:

The Maxwell-Briscoe Motor Company.

The Reo Motor Car Company.

The Dayton Motor Car Company.

The Premier Manufacturing Company.

The Jackson Automobile Company.

The Mitchell Motor Car Company.

These six firms were admitted to membership on the condition that they pay a license of eight-tenths of one per cent. on the value of all cars manufactured by them to date, and the regular initiation fee of \$2,500. The meeting was well attended, all of the members of the Licensed Association, with one exception, being present. It was presided over by Charles Clifton, of the Pierce Arrow Motor Car Company, while M. L. Downs acted as secretary.

In addition to the above mentioned six firms the Overland Automobile Company, of Indianapolis, and Toledo, Ohio, has just joined the Licensed Association. By the purchase of the Pope-Toledo Motor Car plant, patents and good will, early last summer, the company acquired a membership in the Licensed Association, and it is under these rights, secured from the Pope Motor Car Company, that the Overland will operate in future.

Up to the present time the manufacturers of the Overland and Marion have been affiliated with the independent manufacturers, but in view of Judge Hough's recent decision, and in line with the company's policy of concentration, it has just been decided to manufacture the entire future product under one policy, that of the Association of Licensed Automobile Manufacturers.

The Buick Motor Company, of Flint, Mich., which has been a member of the Licensed Association since it was founded, but which some years ago refused to pay further royalties, has paid up all back royalties, and its good standing as a member has thereby been re-established. The Olds Motor Works, which were expelled about a year ago, have been taken back into the association.

### Pennsylvania Number Plate Contract.

The Pennsylvania State Highway Department will shortly open bids for the supply of automobile number plates for 1910. The tags will be of blue enamel, bearing the State name, year and license numbers in white letters. At one side there will

be a keystone of soft white enamel, which will bear the manufacturer's serial number, which latter is a new feature. Thirty-three thousand one hundred automobile tags have been sold in Pennsylvania so far this year, against 25,119 for the whole of last year.

### Eleven Entries for Brighton Beach Race.

At the time of going to press eleven entries have been received for the twenty-four hour race which is to be held on Brighton Beach track next Friday and Saturday, the latest entry being a Marion roadster, which is to be driven by Hugh Hughes and H. H. James. The other entries include two Lozier, Rainier and Buick cars, and one Fiat, Palmer-Singer, American Roadster and Matheson. It has been announced that the race is to be started by Dr. Frederick Cook, of Brooklyn, the Arctic explorer. Dr. Cook will be the guest of the Motor Racing Association.

#### Entries for Vanderbilt Cup Race.

Up to the time of going to press fourteen cars had been entered for the Vanderbilt Cup race, which is to be held on Long Island October 30. Most of the entries were the result of a visit of Manager A. R. Pardington and Fred J. Wagner to Philadelphia at the time of the Fairmount Park race. The entries include the following: Four Chalmers-Detroit, two Fiat, two Buick, two Nationals, two Simplex, a Moon and an Isotta. Two French Renaults are also expected. Entries close on October 25.

#### Business Troubles.

Wm. Henkel, Jr., has been appointed receiver for Walter G. Pierson, dealer in auto supplies at 43 Cortlandt street, New York. A petition in bankruptcy against Mr. Pierson was made by the following creditors: Cornelius D. McGiehan, \$250; Manhattan Screw and Stamping Works, \$147; A. R. Mosler & Co., \$86, and Indicator Sales Company, \$19. It was alleged that he is insolvent, made preferential payments to three creditors, and transferred his auto supply business to the Pierson Motor Supply Company, controlled by him and his wife. That company was incorporated on November 27, 1908, with a capital stock of \$20,000. He began business in 1898 as a publisher, and went into auto supplies about three years ago.

### Chicago Reliability Contest Abandoned.

The Chicago Motor Club, having been refused the change in the contest rules for which it petitioned the A. A. A., has abandoned its 1,000 mile reliability run, as it felt that it could not get a sufficient number of entries together under the old rules. A committee of the club will go to Detroit in the near future and lay the matter before Howard Coffin, chairman of the Manufacturers' Contest Association, with the object of securing a rehearing of the question on the part of the A. A. A contest committee.

#### MINOR MENTION



The Lexington Automobile Company, Lexington, Ky., will remove to Connersville, Ind.

The Boston Automobile Dealers' Association is holding its annual banquet today (Wednesday) at the Ferncroft Inn, Middletown.

In the Republic of Mexico 1,750 automobiles have been registered to date, of which no less than 1,500 are owned in the city of Mexico.

The Waterloo Automobile Parts Company, Waterloo, Ind., have started work on an 80x250 foot building on a 3 acre plot, which will be ready for occupancy January 1.

The dealers of Washington, D. C., held a meeting at the Regent Hotel on October 9 to consider the advisability of holding a local show after the New York and Chicago shows.

Welch Brothers Motor Car Company, of Milwaukee, agents for the Packard and Rauch & Lang electric, have taken the Continental tire and demountable rim agency for Milwaukee.

The Ditweiler Manufacturing Company, which has just been incorporated in Ohio with a capital stock of \$50,000, has located at Galion, and will manufacture a steering gear for automobiles.

The Auto Parts Manufacturing Company, of Muncie, Ind., have just completed the construction of a 60x125 foot saw tooth addition to their factory. They expect to triple their output this year,

It is reported from Salem, Ohio, that Sebring Brothers, owners of the pottery town of Sebring, west of Salem, will build an automobile factory for manufacturing six cylinder touring cars and runabouts.

The Midland Motor Company, East Moline, Ill., has discontinued the use of steam power in its plant and adopted electric power, deriving its current from the circuit of the United Light and Power Company.

The capital stock of the Wisconsin Motor Manufacturing Company, of Milwaukee, Wis., with a factory in North Milwaukee, has been increased by amendment to its articles of incorporation from \$35,000 to \$100,000.

The Precise Company, manufacturers of cam shafts and other automobile parts, will remove from Indianapolis to New Castle, Ind. The officers of the company are A. Afanador, president: John Parker, vice president, and Mr. Morgan, secretary and treasurer.

Tradesmen and private owners of Indianapolis will give a sociability run to French Lick and return Saturday and Sunday, October 16-17. The committee on arrangements is composed of Paul Smith, Frank B. Willis and Frank L. Moore. About thirty entries have been made. There will be two classes, cars costing above \$2,000, and cars costing under \$2,000. A hill climb will be given at French Lick.

The Majestic is the name of a new six cylinder, 90 horse power car to be placed on the market soon by the Milwaukee Auto Engine and Supply Company, 706 and 708 Winnebago street, Milwaukee, Wis.

The seventh annual contest for the Brazier Cup will be held over a circuit to the north of Philadelphia, starting and ending at that city, on next Saturday afternoon, October 16. The course will be 60 miles in length.

A new building 50x105 feet is to be added to the Niagara Falls, Ont., branch works of the Acheson Graphite Company. The new building will contain a grinding plant, a stock room for package goods and a shipping room.

Chas. E. Miller, the well known automobile supply dealer and jobber, announces that he will open a branch at Atlanta, Ga., about November 1. This makes the tenth store operated by Mr. Miller for the sale of automobile accessories and supplies.

The Salem Iron Works, of Winston-Salem, N. C., have decided to take up the manufacture of motor delivery wagons, which will be equipped with a drive invented and patented by C. A. Hege, president and principal owner of the company.

The plant of the Badger Motor Car Company at Columbus, Wis., is rapidly nearing completion, and at least part of it will be occupied soon. The company is building its first models in the large garage of Roberts & Smith at Columbus, which it has leased temporarily.

The new Marion, Ind., works of the Western Motor Works were started on October 5. The company's main factory is located at Logansport, Ind. The tool department of the new factory was started first, and within a short time all of the other departments will be in operation.

The Salisbury Auto Wheel Company, of Jamestown, N. Y., will remove to Peru, Ind., where it will occupy the old Brownell booth works. The company has contracted with the Commercial Club of Peru to buy the plant and equip it with \$40,000 of machinery, whereupon Peru investors will put \$60,000 into the company.

A sixth story has been added to one of the larger buildings of the Franklin plant in Syracuse, which added 15,900 square feet of floor space and doubled the space occupied by the paint shop. Upon the completion of the addition the number of enameling ovens was increased from three to eleven and the rubbing deck space was doubled. The new ovens are all of brick.

The Motor Racing Association of New York has under consideration a plan for making the Brighton Beach Motordrome a permanent establishment. The association has a lease on the property which does not expire until the middle of July next, and under certain conditions it may be renewed.

It is at present being planned to build a steep hill in the infield for hill climbs, and to erect permanent buildings for competing crews, a new field stand and a large garage.

The Board of Supervisors of Nassau County has granted permission to hold the Vanderbilt Cup race on October 30, which removes the final obstacle to the running of the event.

The International Engineering Company, of 1779 Broadway, New York, have secured the exclusive agency for R. B. F. ball bearings, made by the Société Française des Roulements à Billes. Lavalette & Co., who formerly handled these bearings, have relinquished the agency.

The contest committee of the Bay State A. A. have changed the dates of the association's annual reliability run from October 22-23 to October 21-22, so that the results of the contest can be announced on Saturday, October 23. The entry blanks were sent out on October 8.

It is reported that interests connected with the General Motors Company have incorporated a new concern under Maine laws to do an automobile supply and garage business in all parts of the United States. The main office of the parent company is to be in Saginaw, Mich.

The additions to the factory of Gray & Davis, of Amesbury, Mass., have been practically completed, and are partially occupied. They comprise an addition of two stories to one of the wings of their main building, and two new buildings, one for annealing and the other a dyehouse.

The Atlanta (Ga.) Auto Trade Association at a meeting held on September 25 agreed upon prices to be charged for garage service during the Atlanta automobile week, November 6 to 13, inclusive. The schedule of prices can be obtained from Col. F. J. Paxon and S. C. Dobbs. A committee was appointed to look for buildings in the city that might serve as emergency garages, if such should be necessary.

The new Atlanta automobile track is now practically completed, and the surface is now being put in condition by applying road oil. The grand stand and "bleachers" are completed, as are also the judges' stands, press stands, tire pits, administration buildings, garages, etc. An opening exhibition is to be given on the track on October 23, in which Robertson, De Palma and Basle are to take part.

The Fidelity Motor Car Works, of Sycamore, Ill., have finished their first car. F. C. Binkley, who was formerly connected with the Turner Brass Works, is president of the new company, Byron J. Snow is, vice president and A. L. Ellwood secretary. The car was designed by J. F. Waters, who occupies the position of factory superintendent. The car is a one ton delivery wagon, and is equipped with a 20-25 horse power, two cylinder water cooled Davis engine. It has a wheel base of 80 inches, 32 inch wheels and 3 inch Swinehart solid rubber tires. The company plans to build five different types of comercial vehicles.

#### Club Notes.

Seventy-five new members were elected to the New Jersey Automobile and Motor Club at Newark during the month of September. The organization now has nearly 1,800 members.

A movement is on foot in Texas for forming a State automobile association. The San Antonio (Tex.) Club, which seems to be leading in the movement, has appointed Dr. Frederick J. Fielding to represent it in the work of organization.

The Peoria Motor Cycle Club has been formed in Peoria, Ill. The club has about fifty members at present, and plans to hold a race meeting the coming fall. The officers are T. Van Buskirk, president; Earl Shanmeyer, secretary and treasurer, and Milton Hitchcock, captain of club runs.

The Milwaukee Automobile Club has a membership of 355, assets of \$0,000, a cash balance of \$2,650, and owns real estate of much value, according to the annual report of President Clarke S. Drake. It was urged at the annual meeting last week that the proposed clubhouse be built at once.

Motorists of Franklin County, Mass., are planning to form a county association. At a recent meeting in Greenfield, which was presided over by F. E. Snow, a committee was appointed to appear before the State Highway Commission to make an appeal for an allotment of State money for road improvements in the county.

The Sea Isle City Motor Club has been formed at Sea Isle City, N. J., with a charter membership of thirty, and the fol-lowing officers: Charles Woertz, president; Bismarck Kiesswetter, vice president. and Walter Brooks, secretary and treasurer. The new club plans to affiliate with the associated automobile clubs of New Jersey.

The Lake County (Ohio) A. C. was formed at a meeting held in Painesville, Ohio, on October 6. The following officers were elected: E. L. House, president: E. D. Heartwell, vice president; A. W. Colby, secretary and treasurer. The new club will direct its first efforts to securing the improvement of certain roads in Painesville

The Sioux City (Ia.) A. C. is planning to hold an automobile show during the coming winter. A building has not yet been secured, but the Auditorium and the Boston Block are being considered. The club has named a committee to confer with the committee of the Iowa State Automobile Association on matters affecting the two organizations.

The Delaware Automobile Association held a meeting on October 4 and elected the following officers: J. Danforth Bush. president; A. D. Hazzard, vice president; Chas. G. Guyer, secretary; Walter Stanier, treasurer. The association is deeply interested in the improvement of roads in Kent and Sussex counties, and maps of the roads of these counties were shown at the meeting which will be incorporated in the next issue of the association's year book.

Garage Notes.

The Studebaker Automobile Co. is reported to be planning the establishment of a garage in Eau Claire. Wis.

A salesroom for the Empire "20" has been opened in Chicago at 1456 Michigan avenue, in charge of W. H. Chadburne.

The Roman Automobile Co., of Philadelphia, have opened a branch in Washington, D. C., at 1315 and 1317 H street, N. W.

J: H. Morgan has bought a building on Stevens street, Rhinelander, Wis., which he will open as a garage next spring. Mr. Morgan's son Gordon will have charge of the garage.

It is reported that the Roach-Leppo Auto Co.,

Madison, Wis., have disposed of their garage business to A. O. Melaas, of Madison. Mr. Melass will handle the Maxwell exclusively.

A stable at 2 West Ninetieth street, New York city, which was erected only two or three years ago, is to be converted into a garage. The alterations will cost in the neighborhood of \$4,000

W. C. Edmonds, of 2304 St. Paul street, Baltimore. Md., has let the contract for the erection of a garage in the rear of his residence. be a frame building covered with galvanized iron.

Plans are being prepared for the erection of an automobile garage and store building on the East Side in Portland, Ore., at a cost of \$30,000. garage will be one story, 50x200 feet, of brick and

The Electric Auto and Battery Co. has been organized in Minneapolis, Minn., to conduct a garage for electric cars. C. L. Dobbs is manager, and the company has decided to locate at 717 Hennepin avenue.

E. R. Howard and L. M. Cregor, Nashville, Tenn., have leased the building at 135 Third avenue, and will open a garage there on October 15. They will have the agency for the Chalmers-Detroit and the Hugson cars.

The firm of Enos & Brandfield, vehicle dealers. of Grand Rapids, Mich., have entered the auto-mobile field and secured the agencies for the Jackson and Fuller cars. They are at present looking for a garage.

E. K. Spoonheim and A. C. Riddell have organized the Spoonheim-Riddell Motor Sales Co. in Northwood, N. Dak. They have incorporated with a capital stock of \$10,000, and will handle the Halladay and Empire cars.

The Northland Motor Car Co. have recently been organized in Minneapolis, Minn., and have secured the agencies for the Stoddard-Dayton and the Fal cars. The company have secured headquarters at 907 Hennepin avenue. E. E. Houk, Nashville, Tenn., has had plans

prepared for a two story fireproof garage, with sufficient floor space for storing 100 cars. Houk has the agency for the White steam and gasoline lines, and for the Hupmobile.

The firm of Westover & Fulton, Beatrice, Neb., has been dissolved by the withdrawal of Mr. Westover, and the business will be continued by F. Fulton under the style of the Fulton Auto Re-The company's business is located on pair Co. East Court street.

The firm of Wilson & Buffington has been formed at Los Angeles, Cal., to handle the Thomas car in southern California, and they have taken over the Thomas garage at 844 South Olive street. A. S. Robinson wil be sales manager of the new company.

The Corker Co., Atlanta, Ga., have let the contract for a four story 50x100 brick garage building on James and Fairlie streets. The building is to have concrete floors throughout, and will be equipped with all modern garage conveniences. It is to be ready for occupancy December 15.

The Maxwell-Briscoe Motor Co. have opened a factory branch in Omaha, Neb., in charge of Louis T. Doty. An office has been opened at 312 South Eighteenth street, and a garage is being erected for the company on Farnam street. is a two story and basement building 50x120 feet.

The Hamilton Automobile Supply Co. has been organized in Chattanooga, Tenn., with E. G. Skinner as manager. Quarters have been secured in the Thomas Fritts Building, in which the company will operate a garage to be known as the

Crescent Garage. The Overland line will be handled.

O. S. Hubbard, of Hillside avenue, Newton,

Mass., is erecting a garage.

The Broadway Roller Rink, Superior, Wis., is being converted into a garage.

Zantzinger & Borie have let a contract for the erection of a garage in Cynwyd, Pa.

The New Stratman Vehicle Co., Boyceville, Wis. are to establish a garage in that city.

G. H. Jacobson is organizing a stock of to build and operate a garage in Beresford, S. Dak. Frank T. Meagher, of Blue Hill avenue, Milton, Mass., has purchased the garage at Mattapan square.

C. W. Bixby. Wilkes-Barre. Pa., has filed plans for the erection of a one story brick garage at 20 West South street.

The Cataract Power & Conduit Co., of Buffalo, N. Y., are to erect a garage at 970 Front avenue, at a cost of \$4.000.

W. M. Kerr, Carlsbad, Tex., is erecting a 75x100 foot brick garage opposite the Reclamation Building, to cost \$60,000.

A one and a half story brick garage is being erected for A. R. Snowden on Fifth avenue, near Moorwood avenue, Shadyside, Pa., at a cost of

Walter H. Robinson, St. Joseph, Mo., expects to abortly occupy the garage now in course of erection at Thirteenth street and Frederick avenue, St. Joseph, Mo.

E. Holtz will open a garage and repair shop in the Barry Building, Paynesville, Mina. He will handle the Buick, Maxwell, Res and Overland cars.

A garage and hardware store is to be built on Sixth avenue, north of Forest avenue, Des Moines, Ia., for James C. Heath, who intends to combine both businesses.

The E. B. Thompson Co., Pittsburg, Pa., has let a contract for the erection of a reinforced concrete garage on New Louise street, at a cost of about \$40,000.

The firm of Gould & Blossom, St. Johnsbury, Vt., known as the Union Garage & Machine Co., has dissolved partnership. H. B. Blossom will continue the business.

The Jacksonville Automobile Co., Jacksonville, Ill., are about to erect a garage adjoining the post office. The building will comprise a repair shop and salesroom.

Plans are being drawn for the erection of a 50x 150 block brick garage on First street and Scott avenue, Fort Scott, Kan., for Col. W. A. Cormany and W. H. Robinson.

The Ingraham Automobile Co. has been organized in Denver, Col., by W. H. Ingraham and S. L. Bierbauer to handle the Lane steamer. The company plan to open a garage in the business section.

John W. DuBois, of Swedesboro, N. J., has sold his livery stable, which will be converted into a garage. Mr. DuBois will establish an automobile service for traveling men and for those who desire to attend social functions.

Denis B. Duane and J. Schiltz have purchased the Auto Construction Co. garage and machine shop in Rochester, Minn., from Roger H. Mills, The new owners will conduct the business under the name of the Rochester Specialty Co., and will carry a complete line of accessories, in addition to handling the E-M-F, the Flanders Twenty and the Reo cars.

The Petrie-Phillips Automobile Co. has been or ganized in St. Louis, with C. G. Petrie as preident, Jerome Phillips as treasurer, and Roy F. Britton as sccretary. They have reased a building at 1127 Olive street for a term of years, which is now being remodeled, and will be occupied by the company about October 10. The new firm will handle the Parry car.

Lawrence and Benjamin Gottfredson, of Green Bay, Wis., will withdraw from active interest in the Gottfredson Brothers Company, wholesale hardware dealers, on January 1, in order to devote their entire attention to the motor car industry. The company recently established a garage and agency in connection with the bardware business, and will now conduct the auto business

separately. H. L. Everson, of Mariette, Wis., will be associated with them.

W. T. Dill, New Haven, Conn., is having a brick parage erected on Crown street.

Roger H. Mills, 324 South Main street, Rochester, Minn., has sold his garage to Jake H. Schiltz.

Stanley A. Dwight has completed the construction of a garage at 174 Ionia street, Grand Rapida, Ia.

Ed. Dealy and T. F. Quigley, of Maurice, Ia., have rented a building in Le Mars, where they intend to open a garage.

A one story brick garage is to be erected by the Sarah L. Coffin estate, San Francisco, Cal. The estimated cost is \$14,000.

The Regal Motor Sales Co., Cleveland, Ohio, have opened a new salesroom at 1256 Euclid avenue, in charge of G. C. Hipp and F. B. Gott.

R. A. Parker, of Toledo, Ohio, has purchased Gus Uhl's interest in the Standard Garage. Mr. Parker will continue the business along the same lines.

The Gillis-Strickland Motor Co., of Rochester, N. Y., have bought a property at 96 Clinton aveeue South, on which they will erect a showroom and garage.

Harry A. Davis and Whitney A. Clark, Utica, N. Y., have leased a garage at 12 West street, and secured the Oldsmobile agency for Oneida and Herkimer Counties.

The Maxwell-Briscoe-Toledo Co., Toledo, Ohio, expect to occupy their new garage on Madison and Tenth streets early in November. W. H. Mc-Intyre will be manager.

A new building is to be erected for the Chicago branch of the E. R. Thomas Motor Co. at 2257-9 Michigan avenue. Plans for the building are at present being drawn.

The Cox Automobile Co., Harrisburg, Pa., expect to occupy their new garage on South Fourth atreet within the next ten days. They handle Stoddard-Dayton and Herreshoff cars.

The Foss-Hughes Motor Car Co., of Philadelphia, Pa., will open a garage and showroom at Newport, R. I., which will have accommodation for 275 cars. They are Pierce-Arrow agents.

Charles and Jennie Crocker, San Francisco, Cal., have obtained a permit for the construction of a one story brick garage on First street, south of Mission street. The building will cost \$18,000.

The new firm of Sheagrean & Hunt, Burlington, Ia., have opened a garage and salesroom on the corner of Fourth and Washington streets. They will carry a full line of auto and launch accessories.

W. H. LaFountaine, a Pittsburg automobile dealer who left that city about a year ago on account of ill health, has returned there and reengaged in the auto business on Baum street, East End.

The St. Louis-Stearns Automobile Co. has been organized in St. Louis, Mo., to handle the Stearns cars in that territory, and a salesroom has been opened at 1210 Olive street las week, in charge of "Jack" Dunwoodie,

L. J. Wells, of Wells Livery Co., Des Moines, Ia., plans to open a garage in connection with his livery business. A new seven story building for the purpose is now in course of construction at Ninth and Mulberry streets.

J. J. Harter, Sac City, Ia., has taken over the

J. J. Harter, Sac City, Ia., has taken over the automobile end of the business of Harter, Wilson, Brownell & Co., implement dealers. Mr. Harter will open a garage and salesroom and will handle a number of lines of automobiles.

The Toledo-Mitchell Co., Toledo, Ohio, have taken over the garage of the Central Auto Co., said to be one of the oldest garages in that city. The building will be remodeled and put into shape to meet the requirements of the new company.

The C. B. Brokaw Auto Co., of Plainfield, N. J., have taken over the Morris Brothers garage on East Fourth street, which was established in May, 1905. The members of the new firm, which has been incorporated with a capital stock of \$25,000, are Clarence B. Brokaw and Alonzo Brokaw, of Plainfield, and Walter B. Hopping, of New York. Clarence Brokaw was formerly instructor of the

West Side Y. M. C. A. Automobile School in New York city.

The recently incorporated Automobile Supply Co., of Tacoma, Wash., have moved into their new quarters at 757 South C street.

The Tacoma Motor Car Co. occupied its new quarters at 750-2 South street, Tacoma, Wash., on October 4. They handle the Oldsmobile.

The Northwestern Automobile Co. will open a garage on North Twenty-first street, Tacoma, Wash., on October 15. The building will consist of four stories.

On October 1 the Dover (N. J.) Garage passed into the control of R. A. Bennett, the former proprietor, W. Schumann, having severed his connection with the same.

The Joslyn Automobile Co., who handle the Rambler in Rockport, Ill., are planning to erect a 50x150 foot two storage garage. A site for the building has been secured.

An automobile showroom is to be installed at 1281/2 Bedford avenue, Brooklyn, N. Y., in a three story, 20x107 foot building, formerly occupied by the Long Island Wheelmen's Club.

The Ford Motor Co., of Detroit, Mich., have established a factory branch in Atlanta, Ga., with M. C. Huie as manager. Mr. Huie handled Ford cars in Atlanta for a number of years.

E. R. Clark, Atlanta, Ga., has taken the Georgia agency for the Elmore car, and opened a salesroom on the ground floor of the Masonic Temple. The Elmore Motor Car Co. will be organized by Mr. Clark to handle the car in the State.

The Western Automobile Co., Portland, Ore., have secured temporary quarters in the building of the Covey Motor Car Co. at Seventh and Couch streets. Elliott E. Breet will be manager of the new concern. They will handle the Knox car.

The Newby Automobile Co., of New Castle, Ind., is to be reorganized as the Maxwell-Briscoe-Newby Co., and will handle in the future only Maxwell cars and automobile supplies, discontinuing the sale of sporting goods. J. A. Newby will continue as manager.

A garage, repair shop and district agency will be established at Dodgeville, Wis., by the New Stratman Vehicle Co., wagon and carriage makers, as an auxiliary to the vehicle factory. It is planned to engage a factory expert to handle this department.

The Bryant Motor Co., Youngstown, Ohio, has opened its new garage on Jefferson street. The building is equipped with every modern convenience. The garage proper has a floor space of 36,000 square feet. The company handles the Chalmers-Detroit and Hudson cars.

W. A. Voigt and A. G. Maurer. of Sheboygan, Wis., have commenced the erection of a garage on Niagara avenue, Sheboygan. The building will be two stories high, 60x150 feet. The shop will be 50x60 feet, and will be ready by December 1. The remainder of the building will be erected slowly through the winter.

The Apperson Brothers Automobile Co., whose Chicago branch is now located at 1240 Michigan avenue, have taken a lease on a property at Thirty-third street and Indiana avenue, on which a modern three story building is to be erected at a cost of about \$30,000. The lease runs for ten years, at an annual rental of \$4,000.

A co-operative partnership has been formed between Henry F. Bechman, Stephen Rathbun and ex-Mayor Chas. C. Green, of Battle Creek, Mich., to be known as the American Motor Co. The new company will occupy the garage formerly conducted by the American Motor and Cycle Co. as soon as that company's affairs are adjusted. Ed. Hurley and Bob Winslow, Fort Smith,

Ed. Hurley and Bob Winslow, Fort Smith, Ark., have formed the Hurley-Winslow Automobile Co., and let the contract for a two story brick garage at North Seventh and A streets, to cost in the neighborhood of \$20,000. Ralph Lindbloom, of Minneapolis, will have charge of the mechanical department. The company plan to secure the agency for several lines of cars.

George W. Hanson, who handles the Studebaker and Benz cars in Atlanta, Ga., has taken a lease on a garage which is at present being built at 45 Auburn avenue by Chas. Black. This is not an entirely new building, as part of it is reconstructed from an old building. The garage when completed will be \$5x100 feet, and will have a show room in front and storage room in the rear.

The St. Louis House of Delegates has passed a bill authorizing the J. H. Philips Automobile Co. to establish a garage for electric vehicles at 5019 Delmar boulevard. A great deal of opposition was made to this bill by residents in the district.

The Newbold-Speedwell Co. has been organized to handle the Speedwell car in Washington, D. C., and have secured quarters in the building of the Warner Motor Co. on New Hampshire avenue. The members of the firm are John F. and Fleming Newbold.

Very little change will be made in the 1910 agencies in Indianapolis. Among the most important will be the fact that the Fisher Automobile Co. will relinquish the Maxwell agency, and the Maxwell-Briscoe Motor Co. will establish a sales branch. The Hupmobile, which has been handled by the Indiana Automobile Co., has been taken by the Hearsey-Willis Co.

The Jacksonville (Fla.) Motor Car Co. are erecting a modern garage at the corner of Clay and Church streets. The building will be of brick, 105x52 feet, and will accommodate fifty cars. Those interested in the company include S. A. Morris, Chas. Sloan, W. M. Musar and Thos. J. Mason. The company desires to secure the agency for several lines of cars for southern Georgia and Florida.

#### New Incorporations.

Albany Garage Co., Albany, N. Y.—Capital stock increased from \$50,000 to \$100,000.

The Buffalo Maintenance Co., Buffalo, N. Y.— Capital stock, \$5,000. To deal in automobiles and

auto sundries.

The McLaughlin Motor Car Co., Toronto, Canada, has increased its capital stock from \$300,000
to \$1.200,000.

Augusta Garage and Supply Co., Augusta, Ga.— Capital stock, \$15,000, with the privilege of increasing it to \$50,000.

Des Moines Auto Gas Co., Des Moines, Ia.— Capital stock, \$10,000. Incorporators, W. B. Jeffrey and L. D. Wohrer.

Auto & Taxicab Co., Los Angeles, Cal.—Capital stock, \$25,000. Incorporators, C. J. Black, R. C. McClay and J. W. Owen.

Nolan Garage, Los Angeles, Cal.—Capital stock, \$20,000. Incorporators, Geo. N. Nolan, Jr., L.

M. Nolan and Thos. Hopkins. The Cleveland Automobile School Co., Cleveland, Ohio.—Capital stock, \$10,000. Incorporators,

Clyde H. Pratt and W. H. Pettibone.

The Marshall-Clark Motor Car Co., Louisville,
Ky.—Capital stock, \$20,000. Incorporators, R. H.
Edelen, F. S. Clark and T. L. Marshall.

The Motor Sales Co., Grand Forks, N. Dak.— Capital stock, \$10,000. Incorporators, E. K. Spoonbeim, A. C. Riddle and P. K. Spoonbeim.

The C. B. Brokaw Auto Co., Plainfield, N. J.— Capital stock, \$20,000. Incorporators, Clarence Brokaw, Alonzo F. Brokaw and Walter B. Hopning.

General Motor Car Co., Ltd., St. Louis, Mo.— Capital stock, \$20,000. Incorporators, J. A. Hutchison, H. C. Gottfried, C. H. Smith and Sidney B. Cohn.

Pomona Auto Agency and Supply Co., Pomona, Cal.—Capital stock, \$20,000. Incorporators, E. C. Bichowsky, E. L. Downing, B. M. Ledeger, E. A. Rhodes and F. V. Bichowsky.

Auto Parts Manufacturing Co., Peru, Ind.— Capital stock, \$200,000. Incorporators, S. H. Penfield, Benjamin S. Dean, E. D. Shearman, Fredk. Brown, Jr., and John Tomey.

Brown, Jr., and John Tomey.

Holdeman Motor Car Co., Hutchinson, Kan.—
Capital stock, \$25,000. Incorporators, J. H. Holdeman, W. H. Boots, H. B. Holdeman, Geo. Wallace,
William Brown and F. E. Hollinger,

Berkshire Auto Car Co., Springfield, Mass.— Capital stock, \$120,000. Incorporators, John Mc-Quaid, Clement F. Coogan, William J. Mercer, John White, Michael Casey, Oscar S. Roberts, Edward B. Belcher and Henry I. Ryan.

ward B. Belcher and Henry J. Ryan.

The Republic Motor Car Co., of Hamilton, Ohio, has filed an amendment to its incorporation papers,

changing its preferred stock of \$250,000 to common stock, making the total of the common stock issued \$500,000.

The Webb Motor Co., Denver, Col.—Capital stock, \$10,000. Incorporators, B. R. Webb, Samuel I. Monarch and M. J. Dorsey.

Ideal Auto Co., Fort Wayne, Ind.-Capital stock, \$25,000. Incorporators, F. K. Safford, M. F. Jones, Geo. B. Hall and M. J. Plitz.

Royal Garage and Taxicab Co., Atlantic City. N. J.-Capital stock, \$50,000. Incorporators, P. D. Royal, W. H. Conn, C. E. Sesinger.

#### Trade Personals.

- S. W. Croxton, Jr., has been appointed to the position of manager of the publicity department of the Croxton-Keeton Motor Co., Massillon, Ohio.
- E. Thomas Keenan, recently manager of the Scranton Automobile Co., Scranton, Pa., has accepted the position of manager of the Hart-Kraft Motor Co., York, Pa.
- H. C. Henderson, who has been connected with the Thomas factory at Buffalo, N. Y., for a number of years, has joined the selling forces of the E. R. Thomas Motor Branch Co. in Boston.

Frank Dunn, who for seven years was connected with the Diamond Rubber Co., has joined the Cleveland branch of the Michelin Tire Co., and will have charge of the office and of local sales.

- L. L. Fest, of Chicago, who will act as assistant to Managers S. A. Miles and Alfred Reeves in the conduct of the Atlanta Show, has arrived in Atlanta, and has taken up active work in connection with the show.
- W. J. Urquhart has assumed the position of general manager of the Western sales department of the White Co., with headquarters in Chicago, succeeding C. A. Hawkins. Mr. Urquhart was formerly assistant sales manager.

Wm. H. Pickens, who has managed the Buick racing team the present season, has resigned from that position, and Louis Strang, one of noted drivers of the Buick Motor Co. (Chevrolet, Burman and Strang), is reported to also have left the company to join the Isotta Import Co.

Wm. F. McGuire, who was manager for the receivers of the Consolidated Manufacturing Co., Toledo. Ohio, for the past three years, will sever his connection with that firm and assume a managerial position with the Ford Motor Co. of Detroit, Mich., on November 1.

R. S. de Mitkiewicz, member of the gas power section of the American Society of Mechanical Engineers, formerly with the Fairbanks Co. in gas power work, has become connected with the Alden Sampson Manufacturing Co., of Pittsfield, Mass., manufacturers of motor trucks and road Mr. de Mitkiewicz will be associated with their New York office, 115 Broadway, as power sales engineer in mechanical transportation.

#### New Agencies.

Omaha, Neb.-C. F. Louk, Fal. Des Moines, Ia.-L. J. Wells, Moon. Chicago, Ill.-Hart Motor Co., Gaeth. Seattle, Wash.-C. S. Cummings, Regal. Pittsburg, Pa.-Martin & Mars, Rambler. Fort Worth, Tex .- Wood & Wood, Buick. New Orleans, La.-H. R. Kron, Peerless. Kramer. Ind.—Joseph Rice, Great Western. Winston, N. C.—The Motor Co., Studebaker. Rugby, N. Dak .- John Swanson, Overland. Syracuse, N. Y.-Willis & Van Brunt, Oakland. Washington, D. C.—The Wilson Co., Hupmobile. Washington, D. C .- The Wilson Co., Hupmobile.

North Yakima, Wash.-Alex, E. McCredy, Winton.

Washington, D. C .- Pope Automobile Co., Oakland.

Minneapolis, Minn.-The Robertson Motor Co., Franklin.

Toledo, Ohio.-The Banting Machine Co., Grabowsky truck.

Los Angeles, Cal.-Messenger-Low Auto Co., Sharp-Arrow.

Brooklyn, N. Y.—Standard Auto and Sales Co.,

1281 Bedford avenue, National, Empire and Oak-

Vancouver, B. C .- British Columbia Automobile Co., Winton,

Burlington, Ia.—Seagrean & Hunt, Chalmers-Detroit and Hudson.

#### Trade Literature Received.

The Waverley Co., Indianapolis, Ind.—Catalogue of Waverley electric carriages for 1910.

S. C. Partington, 422 Prospect Avenue, Buffalo, N. Y.-Circular of the Automatic Automobile Protector.

Pierce-Arrow Motor Car Co., Buffalo, N. Y .-Book entitled "A Month in Europe with a Pierce-Arrow Car."

The Stark Rolling Mill Co., Canton, Ohio.-Catalogue of Alumaloyd, a sheet metal for automobile construction.

E. R. Thomas Motor Co., Buffalo, N. Y .- Reprint of a description of the Thomas Flyer, Model M, from one of the trade papers.

Premier Motor Manufacturing Co., Indianapolis, Ind .- Booklet intended for Premier agents, containing a digest of a talk by Albert J. Stocker at the recent Indianapolis convention of Premier

National Brake and Clutch Co., 16 State Street, Boston, Mass.—Reprint of a paper recently read before the National Association of Cotton Manufacturers on "Cork Inserts as Applied to Textile Machinery."

#### Coming Events.

October 15-16-Twenty-four hour race on Brighton Beach Track, Long Island, New York Motor Racing Association, New York City.

October 16-Philadelphia, Pa., Race for Brazier Cup.

16-17-Indianapolis, Ind., Run to October French Lick and return.

October 21-22—Boston, Mass., Reliability Run, Bay State A. A.

October 23-Oakland, Cal., Road Races, A. C. of California

October 30-Vanderbilt Cup Race, Long Island

Motor Parkway, Long Island, N. Y.
November 1—Indianapolis, Ind., Race Meet, Indianapolis Motor Speedway Co.

November 6-13-National Automobile Show, under the auspices of the N. A. A. M., at Atlanta, Ga.

November 9-Atlanta, Ga., Track Races, Atlanta Automobile Association.

November 20-21-New Orleans, La., Two Day Track Race, New Orleans A. C.

November 22-Flag-to-Flag Reliability Run, from Denver to City of Mexico.

December 29-30-Philadelphia Midwinter Endurance Contest, Quaker City M. C. December 31 to January 7-New York City Annual Show, Grand Central Palace, American Motor Car Manufacturers' Association.

January 8-15-New York Annual Show, Madison Square Garden, Association of Licensed Automobile Manufacturers.

February 5-12, 1910-The Ninth Annual National Show at Chicago, Ill.

February 22-26-Kansas City, Mo., Fourth Annual Show, Convention Hall, Kansas City Automobile Dealers' Association.

#### Patents Issued August 24, 1909.

931,716. Tire .- William H. Bachtel, Canton, Ohio. Filed August 7, 1907.

931,756. Taxameter.-Conrad Hammer, Manor 931,717. Cushioned Wheel.-William H. Bachtel, Canton, Ohio. Filed May 3, 1909.

Park, London, England. Filed September 28, 1908. 931,770. Controlling Device for Transmission Gears .- Albert F. Krause, Buffalo, N. Y. Filed April 10, 1908.

931,832. Process of Deflocculating Non-Metallic Amorphous Bodies .- Edward G. Acheson, Stamford Township, Welland, Ontario, Canada, Filed July 24, 1908.

Automobile Tire.-Charles E. La

Fleur, Philadelphia, Pa. Filed September 13. 1907.

Automobile.-Ulides S. Snyder, Can-931,893. ton, Ohio. Filed October 8, 1908.

Journal Bearing.-Henry Hess, Wava. 931,924. Pa. Filed June 26, 1907.

931,931. Roller Bearing.—Albert T. Buffalo, N. Y. Filed November 12, 1908. Roller Bearing .- Albert T. Killian,

931,976. Internal Combustion Engine.-Fater M. Turner, Pasadena, Cal. Filed August 10, 1908. 931,981. Automobile Combination Lock.-Maurice L. Yuster, Rochester, Ind. Filed June 27, 1908.

Power Transmission Mechanism -031.087. Anthony Bink, Stockton, Cal. Filed June 29, 1908. 931,989. Tire.-Junius A. Bowden, Los Angeles, Cal. Filed December 5, 1908.

931,990. Vehicle Spring.-James N. Brewster, New York, N. Y. Filed May 25, 1908.

Vehicle Body .- Edward H. Rende, 932,058. Cleveland, Ohio. Filed February 27, 1908.

932,113. Foot Warming Radiator for Auto biles.-Edward M. Field, Jr., Minneapolis, Minn. Filed December 26, 1907.

Clutch.-Alonzo C. Mather, Chicago, 932,155.

111. Filed March 1, 1907.
932,234. Brake for the Steering Wheels of Vehicles.—Thomas G. Allen, London, England. Filed November 20, 1908.

932,239. Electrical Ignition for Internal Combustion Engines.—Victor Barreto, Marlow, England. Filed May 11, 1908.
932,282. Combined Fire Engine and Mechan-

ical Propelling Means.-Frank B. Hunter and Harry B. Hunter, Memphis, Tenn. Filed March 23, 1909.

932,310. Pneumatic Wheel Tire.-John Neff, Sr., West Hoboken, N. J. Filed February 20, 1909 932,312. Motor Vehicle.-Lars G. Nilson, Philadelphia, Pa. Filed February 23, 1906.

932.321. Rotary Internal Combustion Engine Albin P. Plates, London, England. Filed March 11, 1909.

Igniter.-George W. Sage, Eureka, 932,332. Cal. Filed October 6, 1908.

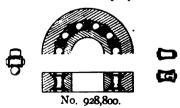
932,338. Spark Plug.—William M. Sleaford, Brighton, Mich. Filed November 16, 1907. 932,360. Carburetor.—Frank J. Watt, New

York, N. Y. Filed October 14, 1907.

932,419. Valveless Internal Combustion Engine. Léon E. Lemperière, La Roche, France. Filed November 8, 1906.

#### Reviews of Specifications. 928,800. Roller Bearing.—August Schilling, of Berlin, Germany. July 20, 1909.

In this bearing the rollers, instead of being either cylindrical or conical, as in the majority of roller bearings, have curved generatrices. The bearing in general is similar to an annular ball bearing, with rollers substituted for balls. The races have curved annular projections of a



smaller radius of curvature than the rollers, so that the latter bear only at a single point, theoretically. The object of this arrangement is to reduce the friction coefficient. In order to be able to fill the bearing completely full of rollers, one or more of the rollers are provided with flats, these being inserted last. The rollers are held in the proper relative positions circumferentially by means of cages, as shown in the illustration.

# The Horseless Age

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#### Larger versus Smaller Tires.

BY JAMES S. MADISON.

The car that has been under daily observation for the past eighteen months is a chain driven, 14-16 horse power runabout, with a two cylinder opposed motor under the seat. The wheels are of the usual artillery type, each wheel having twelve spokes. The size is 30x31/2 inches. With the two passengers who usually ride in it the car weighs 2,300 pounds. It was originally equipped with 30x31/2 inch q. d. tires. The weight supported by each wheel was far in excess of that recommneded by the tire manufacturers. This was a mistake, for which the car manufacturer and not the owner was responsible, unless it be claimed that the owner before purchasing the car should have been sufficiently informed as to specify larger tires. But this would involve the assumption that each prospective purchaser should acquire definite information about the thousand and one details of the making and handling of an automobile before he becomes an owner. This would be desirable for many reasons, but clearly it is impracticable. The new owner must accept much on faith.

In the case in question the tires were overloaded, and could not be expected to give the service for which they were intended. They began to show the effects of the excessive load they were carrying before they had made 1,000 miles; at 1,500 they began to develop sand blisters and suffer a great many cuts from stones and other sharp objects. Soon after this it was a rare occurrence to take the car out for even a short run of to to 20 miles without discovering several bad cuts or blisters on the return. By changing the rear tires to the front wheels, and by the most careful and persistent attention, including scores of vulcanizations, a mileage of 2,400 was obtained from the set when it was discarded. It would have been wiser for many reasons, and truer economy in the end, to have ceased paying any attention to them after the 1,500 mile mark had been passed. This would have saved much time and annoyance. In addition to the excessive weight the tires were carrying, another factor, of secondary importance, which led to their rapid deterioration, was the ignorance of the owner as to the proper method of handling his car in order to save the tiressudden stopping and starting, too frequent and sudden use of the brakes, too great a speed in turning corners, etc.

When the time came to get a new set of tires there was the choice between 30x4 inches and 31x4 inches. In order to make assurance doubly sure, the latter, the so called odd size made to fit a 30x31/2 inch wheel, were selected. This change of casing involved a change of the inner tubes. The new outfit consisted of four casings and five inner tubes, which would cost at the

present prices \$238.65.

The new tires have been under careful observation for six months; they have been driven 3,000 miles. The wear is scarcely perceptible. Their appearance at present would indicate that they will easily give 5,000 or more miles of service. There has been but one puncture; that was caused by a sharp pointed 4 inch logbolt that would have penetrated an inch plank under favorable conditions. One of the reasons for freedom from punctures is largely due to the unusual thickness of the rubber in the tread; the manufacturers claim that this type of tire contains 15 per cent. more rubber than the usual type, in consequence of which the tread is thicker. A number of tacks, pieces of wire and small nails have been removed from the tread that would have caused punctures in the smaller tires.

The effects of the larger tires on the car have been very definite and pro-

#### THE DISADVANTAGES.

The new tires have made the car more sluggish on the hills, and necessitate going into a lower gear earlier and oftener. The owner who equips with the larger tires will find that he is unable to take the same hills on high gear that he formerly did.

The most unpleasant development of the change is the much greater tendency of the car to slip and skid on wet pavements and roads. Shortly after the new tires were on the owner attempted to go up a hill that had been sprinkled with water, on high gear. The car began to slip and turned directly around in the road with the steering wheels at right angles to the direction the car was going. He had gone up that same hill under the same conditions of wetness hundreds of times on high gear without perceptible slipping. Since that first experience he has tried the experiment on the same hill many times; the result is always the

same-there is an unpleasant and even dangerous amount of slipping. He has found it necessary to go into low gear on that hill whenever it is wet. If the road is more than usually muddy or "greasy" from unintelligent or too frequent sprinkling, it is somewhat difficult to make it, even on low gear-not from lack of power as the power is ample, but because of the slipping and skidding.

It is somewhat difficult to arrive at a satisfactory explanation of the slipping. It is not certain that the presumably larger surface of contact between the casings and the road is the cause. While no measurements of the surface of contact of the smaller and larger casings have been made. it should be taken into consideration that the larger ones probably present a smaller surface, in view of the fact that the casings under the load are more curved in spite of the larger dimensions in the new than in the old, due to their being inflated to a higher degree. The smaller tires were inflated to 60 pounds pressure; the larger ones are inflated to 80 pounds (determined in each case by the same gauge). This pressure of 80 pounds is advised by the tire manufacturer and is always maintained.

#### ADVANTAGES.

The most noticeable and most important advantage is a greater liveliness of the car on level stretches. The same position of spark and throttle levers, which formerly drove the car 12-13 miles per hour, now gives it a speed of 15-16 miles; these particular positions are: the spark advanced as far as possible, and the throttle closed as far as possible. These are, fortunately, the most economical positions for the car in

A second advantage is a greater comfort in riding. Many of the small road shocks which were formerly noticed are now absorbed by the tires. This means less work for the springs and less vibration to the

The third advantage is that, notwithstanding the much greater initial cost, there is a very substantial economy if the calculation be made by dividing the cost of the tires by the total mileage obtained. The smaller set cost \$160, making the cost per mile 63/3 cents. Assuming that the larger set will give a mileage of 5,000, the cost per mile will be 434 cents.

The larger tires has been so satisfactory that there never will be any question in the writer's mind of going back to the smaller

#### Rendering Cars More Quiet.

By Albert L. Clough.

It should not be forgotten that the enclosing of the various elements of a motor car serves another very useful purpose besides guarding the parts from the weather and from the intrusion of dirt and dust and of localizing the supply of lubricant. The surrounding of moving parts by tight housings or cases confines and deadens the noises made by the parts thus enclosed. The hood which covers the motor, the covers which protect the valve action on some cars, the casings which surround the engine gears, the cases which house the gear set and the final drive all serve this purpose in addition to their primary functions. The same thing may be said of the pan which underlies the entire mechanism and the car body which overlies it.

#### STRIPPED CAR SHOWS DIFFERENCE.

Anyone who has noticed the noise made by a stripped car being tested out with the engine hood and body removed and the pan perhaps discarded, as compared with the sound made by the same car in normal operation, will realize how important is the quieting effect of enclosing working parts.

It is safe to say that if all noise producing parts of a car were completely enclosed by perfectly non-sonorous housings no noise would be transmitted to the surrounding air and the car would operate in perfect silence. All the energy possessed by the sound waves set up by the working parts would be frittered away as heat within the housings, and none would be conducted by these housings to the outer air.

In practice, however, it is impossible to realize these conditions in two respects, for it is impracticable to absolutely enclose all parts, and it is not feasible to employ absolutely non-sonorous materials for the housings. The engine housing or bonnet (at least in the accepted type of construction) must be more or less open for the ingress of cooling air, and the rear end of the underpan is generally not closed in about the under side of the body, because the air current must have exit. The mechanism is thus not fully housed.

#### ALL METALS RESONANT.

Metals are the most available materials for the construction of housings, and metals are all more or less resonant. Sheet steel, the most commonly employed material, is highly resonant, and aluminum is quite sonorous. The sonorous property seems to be roughly related to the elastic qualities of materials and to the homegeneity of their fibrous texture. Such materials as leather, paper and fabrics are almost non-sonorous. Thin sheets of sonorous materials are especially prone to transmit noises to the outside air when used as housings, and this

is the reason why sheet steel hoods and underpans are no more effective "sound proofers."

The writer was prompted by curiosity to try the following experiment: A car, in first class running order, was operated at constant speed over a level road, and, at intervals, a heavy carriage robe was placed over and taken off from the tight metal hood. It was easy for a person in the tonneau, with his eves closed, to tell when the robe was put in place and when it was removed, by the increase of noise due to its being taken off. The difference was specially noticeable when the car was being run on the low and middle gears, the valve action being more noticeable under these conditions than when third speed was engaged.

#### TRIALS WITH A ROBE.

This was undoubtedly an instance of the taking up of noise vibrations by the metal of the hood and their transmission to the external air. The robe, in great measure, absorbed the vibrations which would otherwise have been communicated to the air. One of the leading manufacturers is said recently to have adopted soft sheet copper as a substitute for sheet steel for his hoods, copper being much less sonorous than steel. It would be interesting to know whether any manufacturer has experimented with a metal hood lined with vulcanized fibre. This material is noticeably non-sonorous, as witness its employment for phonograph horns, where the object to be attained is to direct the sound, and the object to be avoided is the addition to the reproduced speech or music of any characteristic tone due to the vibration of the horn itsèlf.

It is not at all apparent why vulcanized fibre should not prove an available material for light housings, which are desired to possess non-sonorous properties; such housings, for instance, as those enclosing valve push rods and engine and auxiliary gears. A proper quality of vulcanized fibre can be molded into quite intricate shapes, is readily worked, is light, is not adversely affected by oil and is a very rugged material. While it swells when subjected to moisture it can be treated so as to prevent this.

The tight metal hood is a great improvement over the hood with side openings, which was common a few years ago, as it confines the sound much more closely. The use of sound deadening material, such as rawhide or rubber, between the edges of the hood and its supports may assist in making it less sonorous as well as fulfilling its primary purpose of preventing rattling.

#### THROUGH THE RADIATOR.

A very large proportion of the noise which escapes from the engine to the outer

air passes through the radiator. This is very noticeable to a person who walks around a car which is standing with the engine idling. The experiment was tried of stationing a person at some distance directly in front of a car with his back turned toward the same. He could tell instantly when a carriage robe was thrown over the radiator front and when it was removed, the noise being very slight indeed under the former circumstances, and very considerable under the latter. It is quite noticeable that the motors of air cooled cars, which have only a light screen in the place of the radiator, are decidedly noisy when approaching one

Another thing which must have frequently been noticed is the silent running qualities of cars fitted with hoods of the Renault type, and with the radiator mounted between the engine and the dash. The hood being practically closed, there is but little escape of engine noise toward the front, which is one of several advantages of this type of construction.

Anyone who takes the trouble to lean under the rear end of a car, with the motor idling, and to place his ear near the rear opened end of the pan, is likely to be surprised at the volume of engine noise which issues therefrom. When first or second gear is engaged, and the car is running, the effect may be expected to be even more marked. Closing the pan together at its rear end as much as possible and still leaving room for the escape of the cooling air would seem to be advisable.

It may be stated as an opinion that with the accepted type of radiator arrangement the front end of a car is essentially its noisiest "point of view," so to speak. With a properly devised hood and pan the noises emanating from the sides may be very well muffled. The rear end is likely to be the essentially next noisiest "viewpoint."

SOLID CAST WEB CONSTRUCTION.

Speaking of the underprotection, the use of a solid cast web construction for the pan is probably more conducive to quietness of operation than the employment of a sheet metal construction for this purpose. Sheet steel is resonant in a "drum-like" way, and transmits sounds with facility, while the heavier construction is much less liable to do so. As a rattle producing device the sheet iron underpan is all that can be desired.

So insistent is the demand for quietness of operation that manufacturers are justified in using every means to attain it. The problem is twofold: first, to minimize the noise developed, and, second, to confine, as far as possible, the noise which is unavoidably produced. A vast deal of attention has been paid to the first, but rather less to the second, and there is opportunity for some improvement in this direction.

The use of non-sonorous housings wherever applicable, the introduction of lagged or lined non-resonant hoods, and the fitting of closer and more substantial underpans are suggested.

#### Automobiles in Egypt.

Previous to 1907 the customs department included the spare parts with the importation of the cars, but in that year the classification was divided into two categories (1) complete cars and (2) detached parts. The following statement shows the imports into Egypt of motor cars and detached parts during the years 1907 and 1908:

While the statistics plainly show the hold which French cars have on the Egyptian market, the actual figures are somewhat misleading, for we are given to understand on good authority that a number of cars credited to England are really of French origin, but shipped from England. The French makers were the first, in the field

		-Moto	Detached Parts.			
	—-I	907		908.—	1907.	1908.
Whence Imported.	Number.	Value.	Number.	Value.	Value.	Value.
France	188	\$456,180	61	\$149,456	\$35,668	\$13,390
Italy	3	7,543	17	45,733	790	2,787
England	41	82,029	18	28,768	8,240	1,221
Germany	7	14,863	6	13,529	****	385
Austria	3	8,600	4	6,470	2,882	
United States	1	1,928	1	1,384	1,196	
All other countries	7	15,137	1.0		****	412
		7777				7-1
Totals	250	\$586,280	107	\$245,340	\$48,776	\$18,195

Apart from the point that people here cannot at the present time afford to run cars as they could a couple of years ago, it must be remembered that Egypt is not by any means a "motorist's paradise." Roads up and down the country on which a motor can be used are unknown, and, therefore, apart from Cairo and Alexandria with their respective suburbs, no trade can, under existing conditions, be done with the provinces.

Cairo is far better off for length of roads than Alexandria, for there the motorist can travel from Heliopolis out to the Pyramids, a distance of about 18 miles. The old overland route from Cairo to Suez can also be used to some extent. In Alexandria the motorist is confined to a run to San Stefano, 10 miles. Additional roads, however, are now being constructed both in Cairo and Alexandria, which will somewhat improve matters in this respect.

#### KINDS OF MOTOR CARS IN USE.

Despite the absence of facilities for making long journeys, the demand' in the past, generally speaking, has been for large cars of high power and fitted up in the most luxurious fashion. Seeing that hills of any kind or size are conspicuous by their absence, and that the distances to be traveled are so limited, it seems absurd for a man to have a 40 to 60 horse power car for ordinary purposes, unless he makes use of it for touring in Europe. It has, to some extent, been a case of social rivalry, pure and simple, without much regard to utility. There is no doubt that at the present moment many motorists are regretting that they did not consider the latter qualification rather than the former when they made their purchases, for there are many cars in the garages today which have been standing idle for months and months owing to the inability of the owners to pay the charges for running them. When the present financial troubles are over and money is again earned rapidly, the lessons of the past, so far as cars are concerned, will be forgotten, and the demand once more will be for expensive automobiles.

here, and they have reaped the benefit of their enterprise.

The general manager of one of the largest motor car concerns in the country recently informed the writer that there was an opening for British cars, and that he had been trying, unsuccessfully, to find a good English firm which would be willing to ship a car out on what he termed reasonable conditions, such as, for example, 50 per cent. of the purchase money down, and the balance when a sale was effected.

#### GARAGES, CAR PRICES AND TRADE OUTLOOK.

In addition to sundry small repair shops, there are two well fitted garages in Cairo and one in Alexandria, where repairs can be made. The charges for garaging are about \$12.50 a month for a car not exceeding 10 horse power, and \$17.50 for the larger ones. These charges include washing, cleaning and storage. Petrol is supplied at the rate of \$2.40 per 36 liters (about 27 cents per gallon).

Tires do not wear as well out here as they do in England, the principal reason being the soft, gritty nature of the roads and climatic conditions. The prices of tires run about 18 per cent. to 20 per cent. above quotations in England.

As a rough indication of the prices at which cars are sold in Egypt, cost, freight and duty paid, the following classifications are given: The rich man's landaulet and other similar cars, including harem cars, \$3,890 to \$5,840; the second category, from \$2,920 to \$3,890; the professional man's car from \$975 to \$1,950.

As far as we can gather the motor trade in Egypt is beginning to brighten a little, and cars are now being sold again. For the moment, the Europeans appear to be the buyers rather than the rich young natives, and it is interesting to note that the professional classes are inclined to purchase cars for use in connection with their work; for example, out of five recent sales we understand that three of them were for doctors.

The motor omnibuses and wagons in Alexandria do not appear to have been a

success, for none of them are now at work. The Alexandria municipality has recently granted permission to three separate firms to each put fifty motor taxicabs on the streets. A fourth firm has sent in an application for the same privilege. The first taxicab plied for hire on July 14, and three more have since been added.

#### MOTOR CAR REGULATIONS.

Except in the case of private electric cars, which are entirely exempted, all automobiles in Alexandria and Cairo must be registered and numbered. The following figures relate to the regulations in force in June, 1909: Alexandria, 181 private cars, 28 motor omnibuses, 16 motor wagons and no motor cabs; Cairo, 501 private cars, 28 motor omnibuses, 5 motor wagons and 38 taxicabs, of which 5 were electrically driven.

For Cairo and suburbs the speed limit for automobiles of any description is 15 kilometers (9.3 miles) per hour. In Alexandria the limit for private cars is 15 kilometers, but in the suburbs there is no fixed limit for private cars, but one of 15 kilometers for other vehicles.—From Bulletin of British Chamber of Commerce for Egypt.

#### Imports and Exports for August.

The imports of automobiles continue to show a slight increase. During the month of August there were imported 194 cars valued at \$333,960 and parts valued at \$114,-973, as compared with 179 cars valued at \$280,070 and parts valued at \$40,676 in August, 1908. The heavy increase in the importation of parts is particularly noticeable. Of the 194 cars imported last August, 109 were from France, 52 from Italy, 9 from Germany, 8 from the United Kingdom and 16 from other countries. During the eight months ending with August, 1909, there were imported 1,058 automobiles valued at \$1,926,603 and parts valued at \$575,971, as compared with 737 cars valued at \$1,451,-594 and parts valued at \$348,431 during the same period the previous year.

During the month of August last there were exported 360 automobiles valued at \$557,934 and parts valued at \$100,622, a total of \$658,556, as compared with 156 cars valued at \$346,796 and parts valued at \$44,-074, a total of \$390,870 during the same period the previous year. It will be observed that the exports of both complete cars and parts show a heavy increase. During the eight months ending with August, 1909, there were exported 2,140 cars valued at \$5,107,953 and parts valued at \$526,492, a total of \$5,634,445, as compared with 1,684 cars valued at \$3,569,962 and parts valued at \$434,849, a total of \$4,004,811 during the same period the previous year. Perhaps the most remarkable thing in connection with these statistics is the high average value of the exported cars, about \$2,500, which is considerably higher than the average value of the imported cars, which figures out to less than \$1,900.

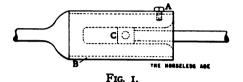
# Maintenance and Repairs



### Repairs and Difficulties. By H. S. Wheeler.

SUBSTITUTE FOR A SET SCREW.

Once when at the bottom of a steep hill the clutch was dropped in but the car did not pick up speed. Upon investigation it was found that set screw A (see Fig. 1), holding the casing of the universal joint



between the clutch and transmission, had dropped out. The casing or sleeve B had worked ahead so that the square blocks C had dropped out into the sod pan. 'The set screw was gone, and the question was "How shall we get home?"

The joint was reassembled and a piece of wood requisitioned from a fence rail. This was whittled into a plug, driven into the set screw hole, turned a half turn in the hole with the pliers (so the wood entered the thread) and was wired in. The car got in with this repair, as obviously there is very little strain on the set screw holding the universal sleeve in place.

A permanent repair was made by fitting a new set screw, drilling the head and passing a wire through it and around the sleeve.

#### QUIETING TIMING GEARS.

The timing gears in a car of an obsolete model became noisy, as timing gears will, and the problem was to quiet them. It was done as illustrated in Fig. 2A. Some very thin sheet copper was secured and cut to the same width as the idler gear face. This was fitted carefully over the teeth and fastened in several places, as at A in Fig. 2B.

A little depression was filed at the root of a tooth B, the two ends (or single thicknesses) were pressed into place in the depression, and a soft iron wire passed



over the ends and fastened completed the repair. The thickness of copper used is determined by the amount of back lash and clearance in the gears.

#### REPAIRING A CRACKED CYLINDER.

One day a car came in with the front cylinder casting cracked at the fan stud.

The fan stud was removed and the shoulder turned down a bit, and a patch was fitted over the crack and around the hole where the stud was screwed in. Care was taken to see that the shoulder of the stud had a good bearing on the patch. The stud was then tightly screwed down in place, with the patch over the crack, and the whole was brazed together, thus making a permanent repair.

Originally the stud had a taper thread, so screwing it up against the shoulder prevented the stud from being screwed in further by the pull of the fan belt and forcing the crack in the jacket open.

#### A MAKESHIFT COMMUTATOR SPRING.

An old "one lunger" with cam commutator got into trouble one day. The flat commutator spring A broke on the road. To get home a new spring (?) was made with hammer and cold chisel from a convenient tomato can, using a piece of steel wire bent as at B for a spring.

Once a cylinder head gasket blew out "40 miles from nowhere" (and no interurban). Of course, no packing was at hand, but after a little thought a gasket



that made the return trip possible was fashioned from a piece of rubber matting from one of the running boards.

STARTING ACETYLENE GENERATOR IN COLD

#### WEATHER.

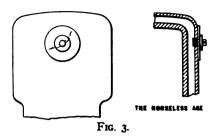
Alcohol in water will lower the freezing temperature of the mixture, but too much alcohol in the water of an acetylene generator will give a yellow flame of little penetrating power. Usually the heat generated by the action of the water on the carbide will keep the water from freezing, but the question is to start the generator when the water is frozen.

To do this make a torch of a piece of waste saturated with gasoline and tied to the head of a hammer. This will start the ice melting. If you still have trouble put a small piece of carbide into the water tank of the generator. After this has been done it will often be necessary to remove the generator wick for cleaning.

#### MISCELLANEOUS HINTS.

A novice once took his first long trip alone in a "cone clutch" car. Being a novice he kept his foot upon the clutch pedal, causing the clutch to slip and the leather to burn so that it would not hold. Upon getting the garage by 'phone the use of dust applied to the clutch surface was explained, and he was also told to drive some toothpicks under the leather at various points around the clutch circumference. The parting injunction was to "keep your foot off the pedal, except when you want to throw out the clutch."

"For lack of a nail," etc., applies equally well to horse and a motor car. A good many cars have come home successfully with a driving chain or a pump chain repaired (when the side links were not broken) with rivets made from a nail removed from a fence board and riveted over

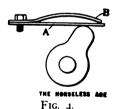


with a stone for an anvil, and in the case of one careless man with a stone for a hammer.

A good many men come in with a tire flat and absolutely ruined because "I couldn't get it off the rim." If the driver had tried running the car carefully for, say, a hundred yards, he would have found that it no longer stuck to the rim and was easily removable.

### New Indiana Manufacturing Concern.

The Indiana Motor and Manufacturing Company has been organized in Indianapolis, and while the general offices will be in that city the factory will be located at Franklin, where the former plant of the American Harness and Leather Company has been purchased. A 35 horse power, five passenger touring car will be made, and will be placed on the market about January I. Officers and directors of the



company are: John C. Billheimer, Indiana Auditor of State, president; Donald J. Hayden, secretary; Charles B. Riley, general manager, and John E. Matson, superintendent and engineer; R. A. Lemcke, Charles A. Denby and W. F. Crawford. The vice president and treasurer is to be elected later. The company has an authorized capitalization of \$100,000.

#### Indiana Registrations.

There were 5.652 motor registrations made with the Indiana Secretary of State between January 1 and October 15, making a total of 14,270 registrations since the law became effective. Of those registering so far this year, about 600 have been owners of motorcycles. The record is much better than that made last year, and it is believed the 1909 registrations will exceed the 6,000 mark.

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#### Next Season's Output.

There appears to be a tendency just at the present time to estimate the number of cars which will be produced next season on the basis of rumors rather than from what previous experience and common sense would tell us. Upon every hand new companies are starting up. Every one of them is reported to be planning to build from 2,000 to 10,000 cars, and if we add these reported thousands together the aggregate is enormous.

A glance backward over the history of automobile promotion for the past few years will show us, however, that only about 10 per cent. of the companies started ever build more than a dozen cars; more than half of them probably never get farther than the production of a model, while many quietly pass out of existence even before the model is completed.

To successfully start a new company four things are essential, namely, sufficient capital, ability to use the money to good advantage, good designing talent, and good producing talent. The combination of the last three is what most new companies lack, and if either of them is missing failure is at least probable.

Of course some of the new companies will prove very prominent factors in the industry. But even of those which start with all the above requisites for success very few will make over a thousand cars the coming season, unless possibly for very late delivery. Not for lack of capital and ability, but because the thing is physically an impossibility, unless the company has a very early start.

Why is it impossible? The best answer is found in the remark a prominent engineer made to us a couple of years ago: "It only takes a very small part to hang up a lot of cars." Lack of a single casting or forging may often mean a long delay.

In the production of an automobile the first step is to perfect the design. This takes considerable time, for a car cannot be successfully made in quantities until every part is exactly right, and there are certain phases of the designing process which cannot be hurried, no matter how much money or experience is available.

Once the design is completed there remains the far more difficult and time consuming process of completing the organization for its manufacture. The making of wood patterns, metal patterns, dies, jigs and fixtures takes months of time, and they must all be completed before rapid production is possible. The greater the output is going to be the more elaborate the equipment required, and the longer it takes to get, it in usable shape.

If the car is to be manufactured by its producer all this work is centred in one shop, with the additional problem of getting the required machinery in time. If it is to be an assembled car the problem is to get reliable, established manufacturers to make the parts, and this must be done in competition with orders from old customers, who are usually given the preference. Foundries and forge shops are now crowded, and it takes some little time to find out just how much faith can be put in their promises and to run the manufacturing schedule accordingly.

For the past few seasons we have watched the best producers of the industry struggle with such problems, and as a result we have little faith in the large outputs promised by most of the newcomers. Some of them will no doubt do wonderfully good work and accomplish all that may be done in the way of rapid starting. But the majority will find that they are face to face with an unexpectedly complicated problem which only actual experience can solve. Conditions today are not like those of a year ago, and every month adds to the difficulty of starting for those who do not know every step of the way.

#### America Now Exports Quality Cars.

Three or four years ago the United States imported automobiles of the most expensive class and exported cars of the cheapest class, mostly runabouts. The average declared value of the imported cars for several years ranged in the neighborhood of \$3,500, while the average value of the exported cars was \$1,550 during the last six months of 1906, when the number of exported cars first began to be stated in the import and export statistics. During the past two years the valuation of the imported cars has constantly decreased, while that of the exported cars has constantly increased, until the returns for the first eight months of the current year show the average value of the exported cars to considerably exceed that of the imported ones.

The rapid growth of our export trade shown by this latest report is extremely gratifying. Taken in connection with the rise in average value it shows that American cars of quality are beginning to be appreciated abroad. The decline in the valuations of the imported cars shows, moreover, that American buyers of the highest grade of cars have come to recognize the fact that it is no longer necessary to go outside the country to meet their requirements, thus confirming the view evidently held by a goodly number of foreign purchasers with respect to American quality cars. There is, however, another possible interpretation of the decline in valuation of foreign cars. In Europe the tendency of late has been entirely away from big. high powered cars, and the manufacturers are featuring and pushing their small cars, or town cars. This holds good of manufacturers of the highest grade cars as well as of those who cannot lay claim to this distinction for their product, and the result has been that aside from taxicabs the automobiles imported during the past year have been for the most part of the lighter

and smaller class, very moderately powered.

With the aggregate valuation of our auto exports for the first eight months of the year exceeding \$5,000,000, we stand a good chance of regaining second place as an auto exporting nation, which was wrested from us by Italy last year. It might have been expected that the en masse production of low priced "Thirties" and "Twenties" in this country during the past year would have led to heavy exports of these types. That but few of these cars seem to have been sent abroad so far may be explained by the fact that the home market for them has been so large that it could not be supplied, and by the further fact that the creation of most of these types is of too recent date for them to seriously influence the export returns.

#### Double Spark Ignition.

In answer to an inquiry in a recent issue we stated that we did not believe that the production of two simultaneous sparks in a motor cylinder would appreciably affect the output of the motor. In making this statement we had reference, of course, to the maximum output of the motor, when the mixture is adjusted to give the most powerful explosion. Such a mixture is very quick burning, as has been proven by very carefully conducted tests. It is also proved by manograph cards taken under such conditions. On an engine diagram taken at full load with the ignition properly timed, the curve upon explosion rises almost vertically, and then drops sharply, thus showing that the entire volume of the gas is ignited almost instantly. If the charge became ignited gradually the curve would rise gradually. This is what it does when the charge is overrich and consequently burns slowly, or when it is too lean. A mixture too lean in gasoline will often continue to burn all through the power and exhaust strokes, and then ignite the new charge as soon as the inlet valve is opened, causing a carburetor explosion.

A mixture which is either too rich or too poor in gasoline can, of course, be burned more rapidly by igniting it at two points at the same time, but in the case of a properly dosed mixture there is no advantage in two simultaneous sparks. The object of the driver should, of course, always be to so adjust the carburetor as to give a substantially perfect mixture, as this will not only insure the maximum power but also will tend to the economizing of the fuel.

#### Fall Touring.

Midsummer is generally regarded as the ideal touring period, and no doubt most of the longer tours are made at that time of year, for one reason because it is the conventional vacation period. But there are those who prefer to make an extended auto trip during the autumn, and there are a number of reasons for their preference. In the first place heavy storms which might interfere with a tour are extremely rare in October and November. Then there are those who tour to enjoy the beauties of nature, and who consider nature at her loveliest when the foliage is turning in color. Finally, many motorists are impelled to make good use of their cars during these months by the reflection that long, weary months are coming, during which there will be little if any chance for pleasure trips in their cars. It is no doubt this latter consideration to a large extent which accounts for the heavy auto pleasure traffic observed in the vicinity of New York on recent Sundays,

The roads are probably less dusty on the whole at this time of the year, owing to the heavy dews and night frosts, than in midsummer, and the enjoyment of scenery and the benefits to health from touring are as much within the reach of motorists now as earlier in the season.

#### Atlantawards.

During the next several weeks events in the automobile world will largely centre around Atlanta, Ga., which aspires to become the Southern distributing centre of the motor car industry. On October 25 a tour will start from New York, headed for the Southern city, which, from present outlooks, will combine more participants than any competitive event of the season. On November 6 the first national automobile show will be opened in Atlanta, and while it will probably not be quite as large as some of the other national shows, especially in respect to accessories, yet no less than sixty car manufacturers have taken space. including most of the older and best known firms, and the show will certainly surpass anything ever seen in this country outside New York, Chicago and Boston. Simultaneously with the show there will be held a series of inaugural events on the new Atlanta motor track, which has been carried to completion in record time.

That the South, and particularly Atlanta, is rapidly gaining in importance as an auto market has been apparent in various ways

of late. Many new agencies have been established there recently; some of the prominent manufacturers have located factory branches there from which they will handle their business in the South Atlantic States, and there has been much activity in garage building in Atlanta recently. The influence of Southern conditions is also apparent in the option given this season by a number of manufacturers on a 60 inch tread. This is the standard width of wagon tracks in the South, and as the roads in that section of the country are in general quite rutty, it is important that cars should "track" with the horse vehicles.

There is little doubt that the chief event of the coming month, the Atlanta Show, will be a thorough success. The show has certainly been effectively advertised by the local press, which, in addition to the New York-Atlanta Tour, is organizing a series of runs to Atlanta from the different towns in the State, and conducting in connection therewith a forceful good roads campaign. The novelty of an automobile show, especially a national show, bids fair to be a strong attraction, and the simultaneous running of races on the newly built speedway should aid in drawing crowds; for, aside from the Florida Beach events and the two road races held at Savannah, automobile racing is more or less a novelty in the South Atlantic States.

#### Coming Events.

October 16-23—San Francisco, Cal., Automobile Show, Emporium Building, Automobile Traffic Association.

October 18-30-Dallas, Tex., Show at State Fair.

October 21-Waterloo, Neb., Race Meet, Waterloo A. A.

October 21-22—Boston, Mass., Reliability Run, Bay State A. A.

October 22—Hartford, Conn., Sociability Contest A. C. of Hartford.

October 22-29—San Antonio, Cal., Reliability Contest, San Antonio Light and Gazette. October 23—Atlanta, Ga., opening of Atlanta

Automobile Track.

October 23—San Francisco, Cal., Road Races, A. C. of California.

October 24-28—Houston, Tex., Five Hundred Mile Endurance Run for Houston Post Trophy.

October 25 to November 3—National Tour, from New York to Atlanta, Ga.

October 27-29—Vicksburg, Miss., Race Meet, Vicksburg A. C.

October 28-30-Dallas, Tex., Race Meet, State Fair.

October 30-Vanderbilt Cup Race, Long Island Motor Parkway, Long Island, N. Y.

October 30-31—Los Angeles, Cal., Inaugural Meet at Ascot Park, Los Angeles Motor Racing Association.

November 1—Indianapolia, Ind., Race Meet, Indianapolis Motor Speedway Co.

November 3-13—Salt Lake City, Utah, Outdoor

November 6-Start of Los Angeles (Cal. Phœnix (Ariz.) Road Race, Maricopa A. C.

#### Carburetor Experiments.

By H. L. HEPBURN.

In my article on "Carburetor Principles" in The Horseless Age of April 14 I proved that whatever might prove to be the law of porportion of gasoline and air to form an explosive mixture under varying conditions, the fixed loss of head of the gasoline jet was sufficient to account for the unsatisfactory results obtained, even supposing the proper proportions of gasoline and air to be constant, whatever the intensity of the engine suction or the compression.

If this fixed loss of head could in some manner be eliminated, and the proper pro-



Fig. 1.

portions of air and gasoline proved to be constant, we would evidently have the perfect carburetor without any valves or springs of any kind, but a free and clear passage both for the air and the gasoline. It should, perhaps, be stated right here that I am talking of the carburetor as a measuring machine without any reference to its action as a vaporizer, as I do not believe it is possible to combine these two functions.

Taking the same two opposed cylinder car, as mentioned in my previous article, I fitted it with a carburetor of well known make, and also connected the top of the float pit of the carburetor to the crank pit of the engine with a one-quarter inch pipe in which were a ball check valve and a needle valve, the ball check being near the crank pit and the needle valve at the float pit. By this means I was able to apply a pressure to the surface of the gasoline in the float pit from the compression in the crank pit, and, moreover, I was able, by means of the needle valve, to regulate this pressure as required. Also, the body of the pipe, lying between the check and needle, acted as a receiver and at a given speed of the engine allowed me to maintain practically a constant pressure in the float pit during the stroke. Again, the rise of pressure of the air in the crank pit was so small and the total amount of air discharged into the float pit so small, in comparison with the displacement of the pistons, that the air pressure in the float pit was practically a constant, no matter what the speed of the engine was.

The carburetor was so mounted that the air entered the top and left through the side opening. The valve cage was removed entirely, and the engine was started. It was found perfectly possible, by means of the regular gasoline needle and the air needle valve, to feed the engine a perfect mixture for both wide open and nearly closed throttle positions while idling, but on wide open throttle a large portion of the gasoline issued from the jet and traveled

clean through the column of air, wetting the intake pipe on the outside with a perfect spray of gasoline. So much for the vaporizing tendencies of this carburetor.

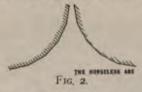
I next soldered an elbow on the cover in such a manner that this stream of gasoline was bound to strike and spread out over its inside surface. The engine could now be fed a perfect mixture while idling on both open and nearly closed throttle, and showed considerable speed, but on a hill which staggered the car the engine would go out entirely below some certain speed, but would catch again and climb the hill at a much lower speed. I scratched my head a long time and finally decided that the gasoline jet was at fault.

#### CHANGED NOZZLES.

The construction giving me somewhat the results of Mr. Tice's nozzle A (see THE Horseless Age of June 19, 1907), I, therefore, decided to remove the offending needle, reducing at the same time the nozzle mouth. This improved matters considerably, but there was still a point of weakness at medium shafts. Next I enlarged the nozzle mouth and introduced the needle down into it, on the supposition that I would get nozzle E of Mr. Tice's article, but very little improvement was noted. Maintaining the needle in this new position, but making it a very long taper, I now tried in succession (1) a nozzle with a tapered entrance, (2) a tapered nozzle, (3) a nozzle with a succession of tapers, as shown in Fig. 2, and (4) a rounded entrance.

These nozzles were successively improvements, but perfect results were not attained on my car until a nozzle was made which was one-sixteenth inch at the mouth, 2 inches at the entrance, and was formed as shown in Fig. 3.

My own idea of the cause of this is that the change of direction of flow of the gasoline particles is so slow that the loss of head, due to any tendency of the stream to



contract, is obviated, and the loss due to friction is reduced to a minimum.

With this shaped nozzle the body of the standard carburetor was abandoned and a special carburetor used in which the nozzle stands vertically in the centre of the float pit, and the air passage dips down into the float pit to, but not below, the gasoline level. The air pressure pipe is dispensed with.

At any rate, my car will now take at a speed of, say, 8 miles per hour, any long hill which it will take under any conditions of speed, and while the car possesses more speed than ever before, I can throttle it

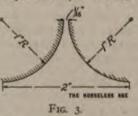
down to run less than 3 miles per hour on the high speed.

Under these latter conditions the 11/4 inch free intake is throttled down (at the throttle only) to the equivalent of a one-eighth inch circle.

In fact, I think so well of the construction that I have taken steps to surround it with patents.

VALVE SETTING AND FUEL ECONOMY.

As regards economy, the mileage was increased in this old type car from to miles per gallon to 12 miles per gallon. I cansider the actual results in any individual case will depend more, or at least as much,



on the engine as its does on the carburetor. While on this subject, I noticed in THE HORSELESS AGE, some months ago, some diagrams showing the increase in power and economy with an increased lay of the inlet valve closing, and these effects increased with each increase of speed. However, if "Careful Reader" will take these curves and prolong them to the left of the diagrams he will find that at speeds of approximately 600 r. p. m. these conditions would largely be reversed. As my recollection goes, I believe the lowest speed shown on any of these diagrams was 1,100 r. p. m., and they would be very applicable to a car geared 3 to 1, with 32 inch wheels, the slowest speed of which on the high gear was about 30 miles per hour:

Personally, I believe in a slight lag of the inlet valve closing, but such results as given in the article noted are misleading to the hasty and the novice. The only thing shown absolutely by the curves is that one and the same engine cannot possibly be the most economical engine on the market under all conditions. Moreover, motorists divide readily into two classes, viz., those whose desire is to climb the biggest hill on high gear, and those whose desire is to speed at all costs, and it is perfectly evident from these curves that, neglecting all carburetor and other defects, the same valve setting cannot give the best results for either economy or power under both tests.

The French budget for the coming year is said to contain a provision according to which the owners of foreign motor cars who travel on French highways will be compelled to pay a tax. The tax is to be based on the horse power of the car, and on the length of time the owner expects to stay in the country. It will be remembered that a similar proposal was made in the Chamber of Deputies a number of years ago, but was promptly voted down because it was considered detrimental to the well developed tourist industry of France.

# NEW VEHICLES



## The New Croxton-Keeton . "Suburban."

The new "Suburban" car built by the Croxton-Keeton Motor Company, of Massillon, Ohio, is expected to become their most popular model for 1910. They will continue the manufacture of their German type 45 horse power car. The new French type "Suburban" will be provided with several designs of bodies, viz., four or six passenger touring, landaulet and brougham bodies. The landaulet is recommended by the makers for use as a taxicab, being provided with the driver's seat at the left; the control levers (speed and brake) in the centre, and a trunk rack on the right in place of the other seat. The turning radius of this car is very short, it being possible to turn completely around in a 25 foot circle. The country or suburban models are all equipped with right hand drive with control at the side. It might be stated also that the town cars can be had with a double front seat instead of single seat and trunk rack, if desired.

The motor is four cylinder, four cycle, water cooled, of 41/4 inch bore and 41/4 inch stroke. The cylinders are cast in pairs with the valves all on one side and operated by a single cam shaft. Very spacious water jackets are used, which are increased at the top over the cylinder head, where the heat is the most intense. The pistons are of gray iron, being of the same material as the cylinders; they are quite long, and are provided with four eccentric compression rings. All pistons are ground to size, and the rings are ground on their sides. The connecting rods are drop forged, of 45 point carbon steel. They are of I section, 103/4 inches long, with a phosphor-bronze bearing at



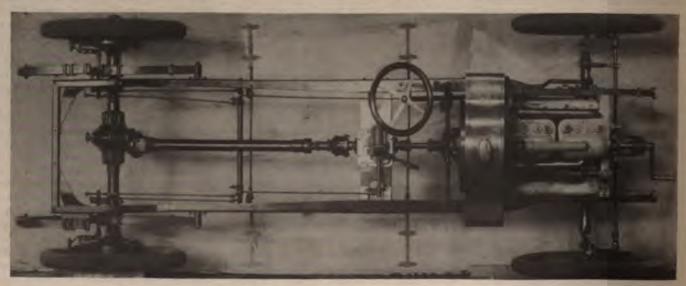
THE CROXTON-KEETON SUBURBAN.

the top, I inch in diameter and 176 inches long. The top of the connecting rod is milled out, making a basin which catches oil for lubricating the piston pin. The lower bearings are die cast of nickel babbitt, 15% inches in diameter and 21/4 inches long. The valves are 134 inches in diameter, with three-eighths of an inch lift, and are interchangeable. The cam shaft is of high carbon steel, 11% inches in diameter, hardened and ground, with three bearings. The cam shaft gear and magneto gears are all housed in an oil tight compartment cast integral with the crank case. The crank shaft is of 45 point carbon steel, hardened and ground, with three main bearings, all 11/4 inches in diameter and the following lengths: Front and centre, 3 inches each; rear, 41/2 inches. The shaft is drop forged and has the flange to which the flywheel is keyed and bolted forged integral with it. The flywheel is of peculiar design, being constructed on the principle of a blower. It takes in air from the right side of the motor and forces it out through the radiator, which is located at the rear of the motor, and over and on either side of it, forming part of the dash. It is claimed

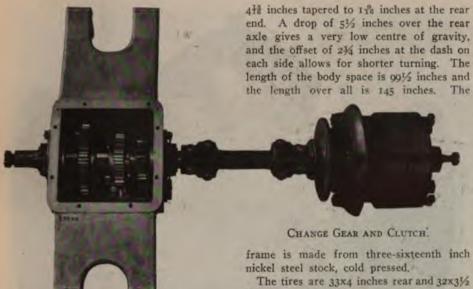
that even though no water pump is used, it is impossible to overheat the motor with this arrangement.

The crank case is in two parts. The lower portion contains two compartments, the lower one being the oil reservoir from which the oil is pumped to the several bearings by a plunger pump, operated by a cam on the cam shaft, and the other compartment forming the splash basins, which are so arranged that the oil level is maintained constant. The top portion of the crank case contains the crank shaft bearings, which are independent of the lower half

The clutch is of the multiple disc type, and is contained in the flywheel. It contains sixty-one discs working in oil. Between the clutch and the change gear is a shaft of nickel steel, the ends of which are squared and fitted into corresponding coupling sleeves. These sleeves connect with the squared ends of the clutch and change gear shafts. The object of these universal joints is to take care of the twisting of the frame over very rough roads, and they also permit of the removal of the clutch without interfering with the motor or gear box. The change gear is of the



PLAN OF CROXTON-KEETON SUBURBAN CHASSIS.



selective sliding type, with the shafts carried on annular ball bearings in an aluminum case. The three speeds forward and reverse are worked through a single lever in an H quadrant. The shafts and gears are of 31/2 per cent. nickel steel and heat treated. Lubrication of the moving parts in the gear box is effected by splash in the casing, which is oil tight. The universal joint immediately to the rear of the gear case is the only universal between the change gear and rear axle. This is a ball type universal and forms the forward support for the torque tube. The propeller shaft is encased in the tube, consequently it is entirely protected from dust and mud, and is carried in New Departure ball bearings at both ends. The driving bevel pinion is keyed to the end of the propeller shaft on a taper bearing, and is held in place by a lock nut and washer.

The differential is of the bevel gear and pinion type, with the casing carried on annular ball bearings. The differential drive gears are keyed on to the ends of the rear wheel drive shafts on taper seats, and are held in place by a lock washer and nut. The rear wheels are keyed to the outer ends of the drive shafts in a similar man-

The rear axle housing and tubes are of liberal size. The axle housing is split in the centre, and a strong truss rod extends underneath the axle from end to end. The front axle is tubular and is dropped 31/2 inches below the centre of the wheel spin-dles. The front wheels are carried on Timken roller bearings. The centre of the

axle is carried forward around the base of the motor to give greater road clearance. The 16 incl steering wheel, with alumi-num spider, tworks through a worm and gear with ball thrust bearings. The worm gear is a full adjustments to new surfaces. The frame, which is especi, ally strong, is of 45% inch channel section. with a maximum width of

Any color desired can be furnished, but blue, with cream gear, and green are the

standard colors.

frame is made from three-sixteenth inch

The tires are 33x4 inches rear and 32x31/2 inches front, and the wheel base is 114 inches. The front wheels have ten spokes and the rear wheels twelve spokes. Quick detachable rims are fitted all around.

The Bosch dual system of ignition is used with combined coil and switch on the dash. The thermo-siphon cooling system is used. There are no spark and throttle levers, as the ignition is fixed, and the engine is controlled by means of an accelerator pedal.

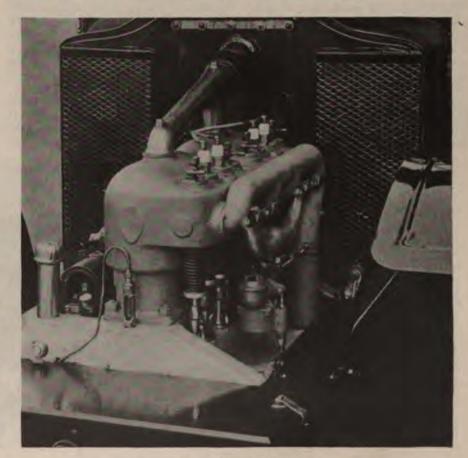
The brake system consists of two internal expanding brakes and two external contracting ones. These all operate on the rear wheel brake drums, which are 14 inches in diameter, with 21/2 inch face. The

internal brakes are the emergency brakes, and are operated by a hand lever at the driver's right hand. The external brakes are the service brakes, and are operated by pedal. Neither set of brakes is interconnected with the clutch, and both sets work through long equalizers.

The springs in front are semi-elliptic, 32 inches long and 134 inches wide. The rear springs are three-quarter scroll elliptic, 43 inches long and 2 inches wide. The front half of the bottom member acts as the radius rod and carries all the driving strains.

#### To Manufacture Axles in Detroit.

The Russel Motor Axle Company has been organized in Detroit, Mich., as a subsidiary to the Russel Wheel and Foundry Company, which recently purchased the plant of the Wagner Machine Tool Company in North Detroit. This plant, which is located on the Bay City division of the Michigan Central Railroad, will be used for the manufacture of automobile axles. They plan to begin operations about December 1. The capital stock of the new organization is \$100,000, and the officers are as follows: A. W. Russel, president; W. S. Russel, vice president, and George B. Russel, secretary and treasurer. The yearly capacity of the plant is given as 10,000 axles, and it is hoped to begin deliveries by the first of the year.



FRONT VIEW OF MOTOR.

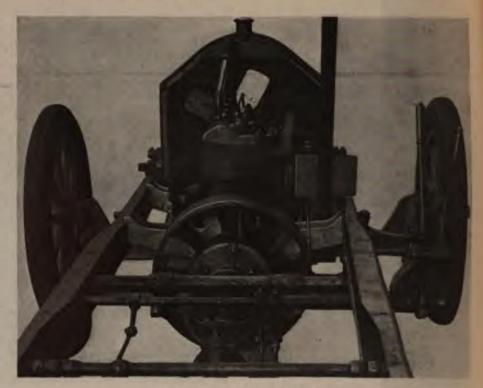
#### The 1910 Model Marion.

Only one type of the Marion car will be built the coming year, which will be known as the Model 10. It will be equipped, at the option of the purchaser, with either a five passenger touring body or a four passenger close coupled body, and the equipment will include a magneto, a Prest-O-Lite tank and a full lamp and tool equipment. In a general way Model 10 will follow closely the lines of Model 9 of the past year. Only changes of minor importance have been made in the construction. Among these may be mentioned the use of the Mercedes type of radiator, giving greater cooling surface; a new design of horizontal steering arm located above and protected from accident by the front axle, and a more roomy body, larger tires, improved springs, and a new and more powerful brake equipment, with all four brakes of the internal expanding type protected from rust and mud; a Fiat type of frame, larger and heavier all around, and narrowed in front to give a short radius in turning; the use of Timken roller bearings, a larger rear axle and an improved multiple disc clutch.

The motor is of the four cylinder, four cycle type, suspended from the main frame, which is especially braced for the purpose. The cylinders are offset from the centre of the crank shaft, and are of 4½ inches bore by 4½ inch stroke, the motor developing 35 horse power at 1,000 r. p. m. Every motor is given four distinct and separate tests for power and smooth running.

The cylinders are cast in pairs, with the valves all on one side. The intake and exhaust being both on one side, the other side of the motor is left free for the water circulating pump and magneto, without crowding either for space.

The crank case is cast in two sections of aluminum alloy. The rotary oil pump, driven by bevel gears from the cam shaft, is housed in the lower section of the crank case, and is so adjusted that the correct



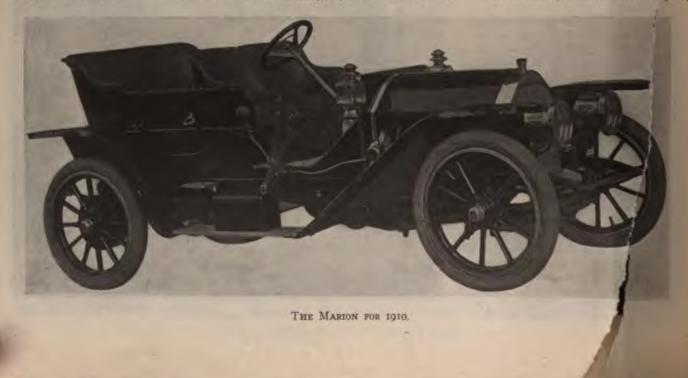
REAR VIEW OF MARION MOTOR.

level of oil is kept in the crank case at all times. The reservoir has a capacity of 2 gallons. A glass sight feed is provided on the left side of the engine through which the quantity of oil flowing may be observed. Timing gears, oiler and other motor parts are reached for repair or adjustment by removal of this lower section of the crank case, which is held in place by castellated nuts. Both the crank case and motor are protected from dust and mud by a sod pan, which extends back beyond the centre of the car.

The crank shaft is drop forged from high carbon steel, hardened and ground. It turns on three white bronze bearings, the latter being easily adjustable for wear. The bearings are of 15% inches diameter, and are tested to insure alignment before assembling.

The valves are of the mushroom type, and are located in the valve chambers of the four cylinders, being operated by the usual arrangement of push rods actuated by the cam shaft. Both inlet and exhaust valves are extra large, thus insuring both a quick and full intake of gas and rapid clearing of the cylinders of the burnt charge. The pistons are long and are fitted with four eccentric rings, all located above the wrist pin. Lubrication channels running through the length of the hollow piston pins aid the oiling of the top connecting rod bearing.

The connecting rods are steel drop forg-

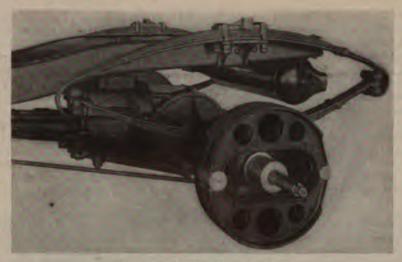


ings of I section. The lower end of each rod is provided with a spoon which dips in the oil in the splash basins for distributing the oil.

The radiators used on 1910 cars are of the Mercedes type, and are carried on two swivelled artillery trunnions, which, by allowing a slight swinging motion, entirely frees the radiator. With merely two bearing caps to remove the task of dismounting the radiator becomes easy, since it is held in position by only four cap screws. The radiator brackets are carried on the upper part of the frame, and the same castings also carry the lamp brackets and the fenders, thus doing away with a number of extra parts, as well as reducing the number of holes in the frame to two. The radiator is provided with a hard rubber filler cap in place of the ordinary brass cover. The water circulation is effected by a centrifugal pump geared to the cam shaft. A large fan, belted to the cam shaft, and a fan spoked flywheel provide a powerful forced draught of cool air around the motor,

Ignition is by a dual system through a single set of spark plugs, both magneto and battery being employed. A push button on the dash coil box is provided for self starting. A water jacketed Schebler carburetor is used. Lubrication is by a gear driven rotary pump, actuated by the cam shaft. The reservoir, which is self contained in the lower section of the crank case, has a capacity of 2 gallons, and is provided with a ball float and glass sight feed, as explained above. This system is automatic, and requires no attention other than to see that the reservoir is supplied with oil. Provision has been made for the lubrication of every moving part, and instead of oil holes grease cups are used.

The clutch is of the multiple disc type, composed of thirty-eight hardened steel discs running in an oil bath. This clutch is located inside the flywheel. The clutch rollers are hardened and ground, and are



HUB BRAKES AND REAR SPRINGS.

provided with individual grease cups. The clashing of gears when changing speeds is prevented by the use of an extension brake foot on the clutch roller, which comes in contact with a revolving disc on the clutch shaft when the clutch is released. As a further protection against noise in changing, the gear shaft rods are placed in parallel with the straight line propeller shaft, and so braced that they will always exert an even pull upon the gears.

The straight line drive has the shaft enclosed within a torsion tube, with but one universal joint, which is of the Hartford type. The change gear, which is of the selective sliding type, providing three forward speeds and reverse, is located in a specially constructed aluminum housing just forward of the rear axle. The same housing contains the differential gears. The gears have I inch face, and are oil treated. All shafts rotate on annular bearings. The sliding members are positively held in the different positions by drop forged locks, instead of by springs, so that no two gears can engage or partially engage at the same time.

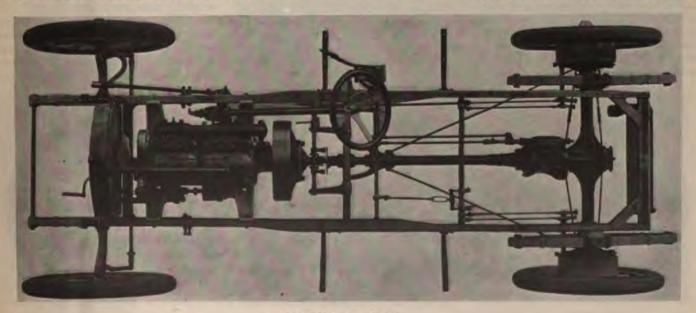
The rear axle is of the semi-floating type, and runs on Timken roller bearings. The axle spindles are heat treated. The entire rear system is housed and protected from dust and mud, but can be gotten at for inspection by the removal of four cap screws.

The front axle is of I section, is drop forged and heat treated. The front wheels revolve on Timken roller bearings.

In the rear axle Timken roller bearings are used next to the differential to take up the end thrust, and Hyatt roller bearings next to the wheels.

The steering gear is a worm and gear, with adjustment for taking up lost motion. It is provided with a ball thrust bearing, both above and below the worm. The steering arm is carried above the front axle instead of below. The spark and throttle control levers are located on top of the 17 inch steering wheel.

The frame is of pressed steel, dropped in the rear and narrowed in front to allow for short turning. It is 25% inches wide in the centre and heavily reinforced at all corners to prevent horizontal as well as vertical strain. All cross members are hot



PLAN VIEW OF CHASSIS.

riveted. A front bar between the springs also prevents vibration and serves as a protection for the lamps and radiator.

Thirty-four by four inch wheels are employed, the front wheels containing ten 134 inch spokes and the rear twelve spokes of the same size, with bosses for supporting the brake drums.

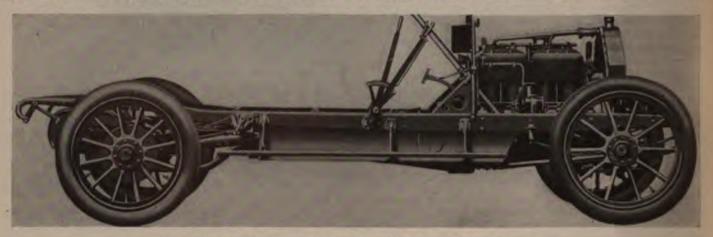
An entirely new system of four brakes is provided this year, these being all of the internal expanding type. Extra large brake drums are placed on the rear wheels. Brake control is by the usual method of pedal and hand lever. The brake rods are

New Features of Latest Stearns Thirty-Sixty Horse Power Cars.

Practically the only change in the new series of Stearns 30-60 horse power cars consists in the adoption of a dry multiple disc clutch, which has been tested out for the past thirteen months. The new clutch, which is illustrated herewith, both assembled and taken apart, consists of a comparatively small number of steel discs of large diameter, which are held and driven by hardened steel keys inserted into the rim of the flywheel. With the exception of the first and the last, these driving discs are

clutch is mounted within the flywheel and centred directly by the extension of the crank shaft, in such a way that there is no possibility of the proper alignment of the rotating members being affected either by the operating mechanism or any misalignment or angularity of its driving connection to the transmission.

The weight of this clutch has permitted to reduce the weight of the flywheel. The inner drum of the clutch is very light, and the floating member of the clutch has a very low moment of inertia. This renders gear shifting easy. The amount of inc-



RIGHT SIDE STEARNS THIRTY-SIXTY HORSE POWER SHAFT DRIVE CHASSIS.

carried inside the frame, and the brakes are operated through equalizers.

The front springs are semi-elliptic, 40 inches long by 2 inches wide, and with six leaves. The rear springs are full elliptic, with scroll ends, 40 inches long by 2 inches wide, and with seven leaves. All spring shackles are provided with individual grease cups. The muffler is placed horizontally across and under the rear of the chassis, and is provided with a cut-out. All bodies are of wood and sheet metal. Either a close coupled or five passenger touring body is supplied at the regular price.

The wheel base is 112 inches, with standard 56 inch tread. The cars are finished in Royal blue or Napier green, with a vermilion running gear. Thirty-four by four inch tires are furnished on Goodyear quick detachable rims.

faced on both sides with an asbestos fabric riveted to them with steel rivets.

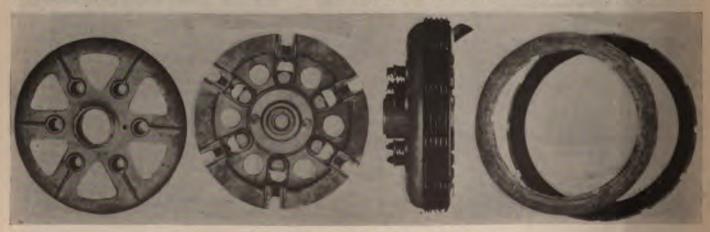
Between each of these discs are the hardened and ground steel driven discs, having integral springs which separate the discs when the clutch is disengaged. From these discs power is transmitted to the clutch drum, which is mounted on the ball bearing projection of the crank shaft, and is connected to the primary shaft of the transmission by a universally jointed shaft.

Owing to the large size of the discs and the character of the material lining them, the pressure required to operate this clutch is said to be extremely light, and is supplied by six coiled springs.

A suitably mounted thrust block in connection with the clutch pedal serves to release this spring pressure and disengage the clutch. The entire rotating part of the tional surface exposed makes for ease of gradual engagement, and at the same time overcomes any tendency to slip. A simple adjustment is provided whereby without disconnecting any of the operating mechanism wear is easily and quickly taken up.

Two other minor changes have been made in the 30-60 model, neither of which alters the main construction of the car nor its appearance. The ignition system now employed is the Bosch dual system, consisting of one set of plugs, with dry cells and high tension magneto. This system has been used on the 15-30 horse power Stearns model for considerably over a year.

The oiling system this year is a refinement of the system used on the 15-30 horse power model last year. The oil is carried in a reservoir in the bottom of the crank case, from which it is pumped and forced



PARTS OF STEARNS DRY PLATE CLUTCH.

through pipes on to the connecting rods. From here it drains back into the reservoir where it is screened, and then again passes through the pump. A bypass valve is also provided whereby a variable proportion of the total oil pumped can be made to pass through an overflow pipe leading directly to the reservoir, thus providing an easy method of controlling the amount of oil projected onto the connecting rods.

Further detail refinements are noticeable in other parts of the car, as instanced by the arrangements of the aluminum boot, designed to form a continuation of the crank case. It is easily removable, and permits of a very clean underbody protection.

The carburetor is of the well known Stearns type, but has been slightly enlarged.

#### The De Dion Eight Cylinder Chassis, Type C. J.

The De Dion-Bouton selling branch, 1649 Broadway, New York, have recently imported a 50 horse power, eight cylinder touring car, which, apart from the motor, has quite a number of interesting constructional features.

The bonnet is not much longer than on the average four cylinder of about the same horse power, but on account of the shape of the motor it is perhaps slightly wider than the average, and the side members of the frame are straight instead of being narrowed at the front, as is now the general practice. The wheel base is 130 inches and the tread 56 inches. The wheels are 36x5½ inches.

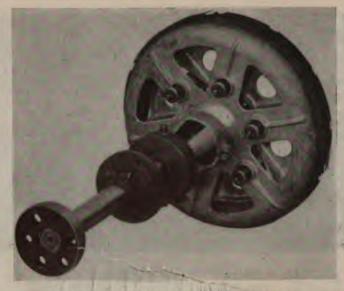
Beginning at the front of the machine, one of the first points observed is the use of a spring shackle at the front end of the front springs instead of at the rear. The advantage of this arrangement was discussed in the issue of October 13, page 414. The radiator is the "Gobe," which is manufactured by a peculiar process. A core of the shape of the water space is made of some alloy which melts at a low temperature. This is then put into an electroplating vat and coated with copper. When this reaches the proper thickness the core is removed from the shell by gently heating the whole, thus melting out the core and leaving the complete shell.

The clutch is the regular De Dion pattern plate clutch, and has no new features. The change gear, however, is quite interesting. It is of the four speed and reverse selective type.

The most striking feature of this gear is the method of lubrication. This consists in the use of a geared oil pump, with leads to the main bearings, as well as to the points at which the gears are in mesh, so that the gears will be properly lubricated with comparatively little oil in the case. This method of lubrication is similar to that employed in the motor.

The method of controlling the gear is also quite novel. The gear level has a straight back and forth motion on the sector.

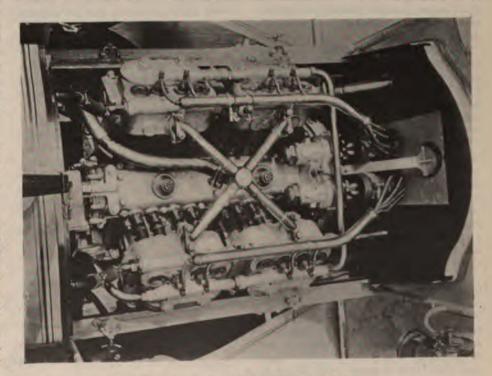
On both sides of it are short stub levers,



STEARNS DRY PLATE CUTTON ASSEMBLED.

which are connected to it by means of a sliding lug on the side of the gear lever, which is operated by a button on the top. Normally, if this button is not pressed, the arm which operates the third speed by a forward motion and the fourth by a backward motion is connected to the operating lever. However, pressing the button on top disconnects this arm and connects the arm which gives the second gear by a backward motion and the first by a forward motion. When the gear is in the first speed position the button can be still further depressed and the lever moved further forward, thus giving the reverse.

While on the subject of control, it may be as well to speak of the brakes. The right pedal operates an internal expanding brake on the rear of the change gear, and also first closes the throttle to the minimum opening. Neither the foot nor the emergency brake, however, is interlocked with the clutch. The rear construction is of the well known De Dion type, with bevel gear housing mounted on the frame and driving the rear wheels by short axles provided with Cardan joints. However, there are one or two new constructional features. In the first place, the propeller shaft is housed and made one with the bevel gear housing. This shaft has the bevel pinion affixed to it, and the distance between it and the gear can be varied from the front end of the housing by a collar just in the rear of the transmission. A universal of very limited motion, to allow for slight twisting of the frame, is formed by a collar having eight cylindrical studs set axially, which fit into



TOP VIEW OF DE DION EIGHT CYLINDER MOTOR.



EIGHT CYLINDER 1046 DE DION CAR

eight corresponding holes in the house the brake drum of the transmission.

The bevel gear housing is suspended from a cross member of the frame by a bolt passing through two lugs. The removal of this one bolt allows of the removal of the bevel gear housing complete from the frame.

The most interesting part of this car is undoubtedly the motor. This is of the eight cylinder V type, which has come into extensive use for flying machines and for other purposes where light weight is essential. The cylinders, which are 31/8×47/8 inches, are cast in pairs, with the valves on one side, and the two sets are at 90 degrees with each other. Two connecting rods of opposing cylinders work on one crank pin. The crank pin bearing is rigidly secured to one of the connecting rods which is in the form of a Y. The other connecting rod rotates on the outside of this bearing, between the arms of the Y. The relative motion between the two connecting rods, however, is comparatively small, being not more than 8 or 10 degrees.

The arrangement of the water circulating system is somewhat peculiar. The water is passed through a centrifugal pump driven from a cross shaft in front of the motor to a pipe which passes it from the left front cylinder to the left rear cylinder, thence to the right rear and thence to the right front. The return, however, is made by pipes leading from each set of cylinders to the right and the left of the radiator. The water is led into the cylinders at the top, between the valves and the cylinder proper, and is taken out at the outside of the valves. The inside of the jacket is suitably cored with partitions to ensure proper circulation. One cam shaft centrally located operates the valves of both sets of cylinders,

The carburetor, a Zenith, supplies the mixture, a single pipe leading to the centre of a cross shaped manifold, the arms of which lead to the centre of each pair of cylinders. Ignition is by Bosch h. t. magneto, two of these being employed and driven off of a gear on the rear of the cam shaft, each magneto being driven by its own gear. The working parts of the

magnetos are made very accessible through a pair of folding doors in the dash.

The order of firing is as follows: 1L, 2R, 3L, 1R, 4L, 3R, 2L, 4R. Fixed spark position is employed.

The lubrication is by the well known pump circulating system, which has now been used by this firm for a number of years. However, two novel adjuncts are employed to indicate the conditions as to quantity of oil and circulation. The first of these is a steel sounding rod permanently kept in an upright tube between the second and third cylinders on the right. This may be withdrawn at any time by means of a knurled knob on its top, and the depth of the oil in the "sump" noted. The other innovation consists in the use of a manometer or pressure gauge on the dash connected to the pump, this showing whether the oil is circulating properly or not. With the exception of this manometer, another for the water circulation, and the magneto switch, the dash is bare.

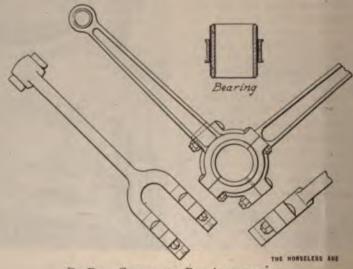
The regular De Dion oil pump is provided, which can be set to supply oil either to the motor, change gear case or differential case. The motor runs remarkably quiet and free from vibration. When it is throttled down one can almost count the separate valve clicks. It is said that the gasoline consumption is at the rate of 1 gallon per 9 or 10 miles.

#### The Salter Car.

Some time ago we announced the organization of the William A. Salter Motor Company, 1516 Oakland avenue, Kansas City, Mo. The company will manufacture a car embodying a number of Mr. Salter's inventions, which are herewith illustrated. The general features of the car are as follows: The engine is a four cylinder, vertical one of 4¼ inch bore and 4½ inch stroke, and is rated at 30 horse power. It is equipped with magneto ignition. A three forward speed planetary change gear is used. The car has a wheel base of 110 inches, and 32 inch wheels fitted with 4 inch tires. The total weight is given as 2,200 pounds. An option is given on a five passenger touring body or a roadster body.

The change speed gear is manufactured under Mr. Salter's patent No. 888,750. It is fitted with annular ball bearings, and is claimed to be very quiet running, as the gear drums travel at only half the speed of the engine when running idle, and at a slower speed when in operation. The entire gear is enclosed in an aluminum casing, and runs in a packing of semi-fluid oil. The low and intermediate speeds are obtained by contracting band brakes, while the high speed clutch is of an internal expanding ring engaging with the drum that carries the internal gear. The gears are all made from Krupp chrome-nickel steel; they are cut with 8 pitch teeth and are heat treated, and the company guarantee them against stripping or chewing out.

The reverse is not combined with the change speed gear, as in common practice, but is combined with the driving gears on the rear axle. The arrangement is covered by patent No. 853,120. The differential housing is provided with two bevel gears instead of one, and by shifting the bevel driving pinion between the two gears by means of eccentric bushings the forward



DE DION CONNECTING ROD ARRANGEMENT.

motion and reverse are obtained at will. The accompanying sectional view of the rear axle and driving shaft clearly shows the arrangement. Hyatt roller bearings are used in the rear axle near the hubs, Timken roller bearings near the differential, and a ball bearing is used at the forward end of the driving shaft.

#### Firestone Tire and Rim Novelties.

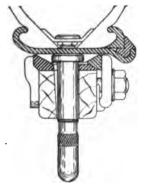
The 1910 Firestone demountable rim (for all quick detachable and clincher tires) will be exhibited for the first time at the Atlanta Show. When used with quick detachable tires this rim permits of repeated tire changes while on the road, even after the motorist has used up his spare tires. Such changes may be made right from the wheel without reference to the demountable feature, and wholly independent of it.

This is made possible by use of a sleeve which fits over the valve stem between the dust cap and base of the quick detachable rim, as illustrated herewith. No locking nut is used, the dust cap on the valve stem serving to hold the spreader in place or release it when the motorist wishes to remove his tire and tube. During this operation the sleeve remains unchanged in its position in the hole in the felloe.

When the rim is demounted in the regular way the sleeve, dust cap, etc., slide through the hole in the felloe.

The Firestone Company have now practically discarded exclusive clincher demountable rims on account of the staybolt nuisance. They have done this in view of the fact that their new rims do away with staybolts, and make it a very simple matter to fit a tire on the spare, detached rim.

At this show the Firestone Tire and Rubber Company will exhibit for the first time their 1910 pneumatic tires. These differ

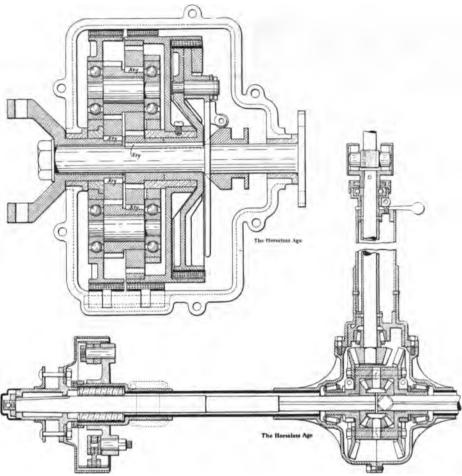


Section of New Firestone Demountable Rim.

from the 1909 product, as in all sizes of the round tread tires the tread has been increased exactly 25 per cent. in thickness and in the non-skid 33½ per cent.

## Coppock Motor Car Company Reorganized.

The Coppock Motor Car Company, of Decatur, Ind., has been reorganized as the Decatur Motor Car Company. The capital stock of the new company is \$150,000, and the following officers have been



SALTER TRANSMISSION AND REAR AXLE.

elected: M. E. Bracket, president; W. J. Vesey, vice president; Julius Haugk, treasurer, and D. L. Quinn, secretary. The company has been operating in Decatur for some years, but was handicapped by lack of working capital. It has on hand material for twelve of its motor trucks, which will be completed immediately, and it is the intention to secure material for twenty-five additional cars.

# Topics for Discussion of the Winter Meeting of the Society of Automobile Engineers.

Among the subjects that discussion at the winter meeting has been asked for are:

Standardization of Pneumatic Tires.
Taxicabs—Requirements and Operating
Cost.

Carburetors—Kerosene Carburetors.

Railway Motor Cars

Drawing Room Systems.

Truck Tires.

Valves in Head versus T Heads.

Alcohol as Fuel in Internal Combustion Motors.

Silencer.

Radiator, Design and Efficiencies.
Critical Temperatures, Cooling Curves of

Critical Temperatures, Cooling Curves o Alloy and Other Steel.

Two Cycle Motor Efficiency and Results. Journal Loads in Transmission Gears.

Placing Society on More Professional Basis.

Efficiency of Spur, Bevel, Worm Gears and Universal Joints.

Relative Efficiency of Four Wheel Front and Rear Drive of Commercial Vehicles.

Detachable versus Demountable Rims—Combination Rim.

Commercial Vehicle Depreciation.

No doubt many will be present during one or the other of this winter's shows at New York. Such of these as would care to be present at the professional meeting of the Society of Automobile Engineers may be assured of a hearty welcome. Their contribution to these discussions will be as welcome as will also more complete papers; the latter should be sent into the society's offices at No. 2 Rector street, New York, to be in the society's hands by November 30 for printing and general distribution before the meeting. Papers and discussions from an engineering standpoint, including also matters of operating finances, are in order

#### Municipal Autos a Campaign Issue.

Municipal automobiles have been made an issue in the city campaign now on in Indianapolis. Two of the mayoralty candidates are charging that members of the present administration use the city automobiles for attending baseball games, picnics and social events. The city owns about twelve cars, distributed among several departments.

#### **COMMUNICATIONS**



## Too Frequent Valve Grinding Required.

Editor Horseless Age:

I should be glad if you would suggest to me in your "Communications" column a remedy for a rather peculiar trouble. I have asked several persons and have thought the matter over carefully.

I have a new car, which I have driven about 1,500 miles so far. The engine is 41/2x41/2, and is eminently satisfactory and flexible, except that about every 200 or 300 miles one or another of the exhaust valves has to be ground. All four of the valves have been ground, and the trouble is recurring. The valves seem to pit, and carbon appears to be the principal trouble. The engine never overheats, not even on long continued, heavy grades, and there have never been any symptoms of preignition. The mixture is perfect; there is a remarkable freedom from smell from the exhaust. and there is no oil smoke. The car (which has showed 52 miles an hour on the road) can be throttled down to 7 miles an hour on high gear, and the engine runs smoothly, as it also does at all intermediate speeds up to the maximum. The oil is that advised by the manufacturers of the car, and is the best I can get. My gasoline is of good quality. My plugs have not sooted up; I have only had to clean them once (although I often inspect them). I run kerosene through the cylinders once or twice a week (according to distance traveled). Practically all my driving is done in the country, and so I drive with the cut-out open much of the time.

There is no missing until suddenly the engine runs on three cylinders, and then I know that one of the exhaust valves needs grinding; for I get out, and, having stopped the engine, on cranking I find no compression in one cylinder. On grinding the proper valve all is well.

The car is most delightful to drive; the engine is extremely flexible, and, as I like to put it, "very obliging"; it will do any thing in reason; the only trouble is that queer trouble with the exhaust valves (which are large). Could it be that the metal of the valves is defective? It is a nuisance to have to grind them so often. The same valve does not have to be ground each time, but, as I said before, about every 200 miles or so a valve has to be ground. In a car that I owned before I only had to grind the valves about every 3,500 or 4,000 miles. I had odometers on both cars, and kept and still keep a mileage record in a book. W. R. VAN BRUNT.

[From your letter we are not quite convinced whether the valves actually need 'nding when there is no compression.

Sometimes, owing to lack of lubrication, the valve stems will become tight in their guides, and the valves will either not close at all or close very sluggishly. Whether this is the trouble you can determine by watching the valve stem and spring while the engine is being turned over by hand. The grinding would, of course, free the stem in its guide and thus remove the trouble temporarily. If this should be found to be the cause of the trouble we would recommend reaming the guides out slightly larger.

It is also possible that the valve heads warp, or it may be that they are made of an inferior material which is easily attacked by head. A test for warping consists in smearing a paste of red lead and oil over the seat, letting the valve down on it and then turning it slightly back and forth by means of a screwdriver. If it is not warped the paste will be squeezed off of the seat equally all round; that is to say, if neither the valve nor the seat is warped.

We are inclined to think that your trouble is due to one of the above two causes. If the valves are large and if there are no signs of overheating there does not seem to be much chance of such frequent pitting of the valves, unless the latter are carried in cages.—ED.]

## Self-Centring Quality of Steering Wheels.

Editor Horseless Age:

Should like to have information regarding the following, if you will be kind enough to give it to me:

Why is it that the front or steering wheels on one automobile will have a tendency to straighten themselves or stay straight if the hand wheel or lever is released, and the wheels on another automobile will have the opposite tendency?

I have several automobiles, and all of the gasoline machines, if I were rounding a curve or struck a rut, would have a tendency to straighten up if I had a light hold on the steering wheel. But I have an electric machine with lever steering, and I am afraid to put any speed on it for the reason that if I start to wabble the wabble gets worse and I would upset, for the tendency of the wheels is to turn more to the side instead of straightening up, and in pulling them back straight with the lever the hand flies over to the other side too far and thus starts a dangerous wabble.

I don't know if I explain this so you can understand it, but I think you will know what I mean.

Originally the electric steered all right, but I had new, heavier wooden wheels put on in place of the suspension wheels and some other changes made, and I don't know what the cause of this trouble is.

My wheels are a little further apart at the bottom than the top; in other words, the axis of the steering knuckle is out of plumb a little wider at the bottom.

Perhaps it should be the reverse of this,

or perhaps this has nothing to do with it.

Can you give me information that will help me out of my difficulty? If so I shall be much obliged.

P. M. SHARPLES,

[Almost every gasoline car is equipped with a non-reversible steering gear, which insures that the steering road wheels stay at the angle to which they are turned, and no amount of bumping can move them. The non-reversible mechanism usually consists of a worm and wheel. If you are familiar with this machine element you know that by turning the worm you can turn the wheel, but it is absolutely impossible to turn the worm by exerting a circumferential pull on the wheel.

The steering levers of electric vehicles are generally connected directly to the steering knuckles, and any shocks received by the wheels are therefore transmitted to the steering lever. The way the steering linkage is usually arranged the system is in an unstable balance. That is, if we suppose the wheels to be turned straight ahead and if one of them then hits a road obstruction, the wheels-supposing the driver has released his grip on the lever-will then be jerked to one side, and there will then be no tendency for them to straighten out again. This is on the supposition that the two axle spindles are exactly parallel with the front axle. The steering gear can be made self centring, to a certain extent at least, by placing the axle spindles back of the steering knuckle pins or pivots.

In the case of your electric car, if the overhauling of the steering gear resulted in an undesirable change in this respect, we can only infer that the tie rod connecting the two steering knuckles is so adjusted that the two front wheels "toe in" in front. If these wheels were wider apart in front than in the rear they would have a slight self centring tendency, whereas if they are wider apart in the rear their equilibrium will be very unstable. However, the tie rod should be so adjusted that they are the same distance apart in front and rear, as otherwise there will be abnormal wear on the tires.—Ed.]

#### Dependence of Tire Life on Cross Section and Wheel Diameter.

Editor Horseless Age:

I have read with a considerable amount of interest your article in the issue of September 22 in reference to tire life, taking into consideration the wheel diameter and cross section. I have taken a very keen interest in the matter myself, and my experience can be summed up relatively shortly.

In regard to the difference in life between, say, a 34 inch tire and a 40 inch tire. I find that the smaller tire is actually the one that lasts the best, the larger tires bursting much more frequently than the smaller ones. I can hardly believe that the larger size of the wheel causes this, as owing to the greater amount of surface in contact with the ground it is unnecessary to pump the tire quite so hard to get exactly the same supporting power through less pressure of air per square inch.

Personally I have put the failure of the large tire down to the fact that it is a size which is not made in large quantities by the tire companies today, or at any rate in Europe, and for some reason or other it does not appear to be so well made as the smaller size. When I started these experiments I had it in my mind that the larger diameter tire would last longer than the smaller one.

So far as the cross section of the tire is concerned, I find that the increase of the cross section materially adds to the life of the tire, and I think it does this for two resons:

- I. The tire with the larger cross section does not have to be pumped so hard to support the weight, and, therefore, there is less stress on the walls of the tire.
- 2. The actual angle of the wall under running is considerably less on the larger cross section than on the smaller one; and again, the actual surface of the tire in contact with the road wears away less rapidly with the large tire than with the smaller one.

From the point of view of cost per mile I find that if you have a tire section big enough for its work further increase, although increasing the comfort of the vehicle, does not decrease the cost of running per mile to any appreciable extent, but, of course, when you increase the size of your cross section of tire on a car which has been previously under-tired the material gain in economy is most noticeable.

In respect to your next query, whether the resilience of wood wheels and the longer. spokes of a 36 inch wheel, as compared with a 30 inch wheel, really efficiently aid in buffing the road shocks, I am quite satisfied that there is something appreciable to be gained in this direction, but its most noticeable effect is when using wire wheels of the suspension type. The same car with the same size of tire (both diameter and cross section) and doing the same work regularly will run 20 per cent. further on its tires on the suspension wire wheels than it will run on wooden wheels, and I cannot put this down to anything else except the fact that there must be some give in the actual rim of the wheel which helps the life of the tire. I admit that it seems most difficult to believe that this should be a fact, but, of course, one has to remember that on the suspension wheel the portion of the tire in contact with the road has nothing to prevent it flattening out, except the strength of the rim, the steel rim spokes practically having no strength in a compression direction.

I certainly believe that this point in regard to economy on tires is one that would stand a very considerable amount of careful investigation. I am in a very unique position to test this, as I live some 40 miles out of London and make the same journey

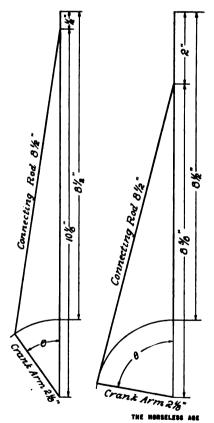
on the same car very frequently, and practically always at the same average speed. For a long time I could hardly believe these results were accurate, but they have been confirmed by many other users of Napier cars, who have had wire wheels fitted in place of the wooden ones, and it is quite an outstanding feature to notice how many of them write and suggest their tires last much longer since the wire wheels were fitted to their cars.

S. F. Edge.

## Ignition Timing by Flywheel Marks.

Editor Horseless Age:

Will you please give me the formula for marking off the position on the flywheel of the time of the spark, knowing the stroke of the piston and the diameter of the flywheel? That is, I wish to know how to time the spark in my auto engine. The manufacturers say that in the extreme retarded position the commutator should be so set that the electric connection is made when the piston is one-half inch past the top centre, and in the fully advanced position it should be so set that it will make



the electric connection 2 inches before reaching the top centre. Now, then, with the piston on top centre and the flywheel marked in that position, how shall I figure out how far to move my flywhel from this position to have the piston one-half inch past the top centre and 2 inches before the top centre, respectively? My piston stroke is 4½ inches, and the diameter of my flywheel is 14 inches.

SAMUEL H. WATSON.

[To accurately calculate the motion of a point on the flywheel corresponding to a

motion of one-half inch and 2 inches from the dead centre, we require to know the length of the connecting rod. But since no very close figures are required, we will assume that the connecting rod is twice as long as the piston stroke, viz., 8½ inches, which cannot be far from the truth. By the connecting rod length we mean the distance from the centre of one connecting rod bearing to the centre of the other bearing.

When the crank is in the top centre position the distance from the crank shaft centre to the piston pin centre is evidently  $8\frac{1}{2} + 2\frac{1}{6} = 10\frac{1}{6}$  inches. When the piston is one-half inch from the end of its stroke this distance is one-half inch less or  $10\frac{1}{6}$  inches. The centre lines of the cylinder, connecting rod and crank arm then form a triangle whose sides are  $2\frac{1}{6}$  inches,  $8\frac{1}{2}$  inches and  $10\frac{1}{6}$  inches long, respectively. What we wish to know is the value of the angle  $\theta$  between the shortest and longest sides, or the angle through which the crank has moved after passing the dead centre.

According tó a trigonometrical rule we

$$\cos \theta = \frac{2\frac{1}{8}^2 + 10\frac{1}{8}^2 - 8\frac{1}{2}^2}{2 \times 2\frac{1}{8} \times 10\frac{1}{8}} = 0.763$$

$$\theta = 40\frac{1}{8} \text{ degrees.}$$

As your flywheel is 14 inches in diameter, it has a circumference of  $14 \times 3.1416 = 44$  inches (approx.). The total circumference is equal to 360 degrees, and the length of arc corresponding to  $21\frac{1}{2}$  degrees is found by a simple proportion.

360: 
$$44 = 40\frac{1}{4}$$
:  $x = 4.92$  inches.

Consequently a point on the flywheel moves practically 5 inches while the piston moves down one-half inch from the top end of the stroke.

The calculation is the same for the position of the piston 2 inches from the top end of the stroke. The sides of the triangle are then 21/8 inches, 81/2 inches and 85/6 inches.

Cos 
$$\theta = \frac{2\frac{1}{8}^{\frac{3}{8}} + 8\frac{1}{8}^{\frac{3}{8}} - 8\frac{1}{2}^{\frac{3}{8}}}{2 \times 2\frac{1}{8} \times 8\frac{1}{8}} = 0.17$$
  
 $\theta = 80\frac{1}{8}$  degrees (approx.)  
 $360: 44 = 80\frac{1}{8}: x$   
 $x = 10$  inches.

Consequently the point on the flywheel rim moves to inches while the piston moves down 2 inches.—ED.]

## Repair of Cylinder Damaged by Broken Valve Head.

Editor Horseless Age:

Please give me your advice on the following:

A valve head pulled off in my machine and, falling on the piston, a hole was punched in the cylinder head; not through to the outside, but between cylinder and water jacket. What suggestion can you make for repair? Would a weld by the oxy-acetylene (autogenous) system be a reliable repair under the circumstances? Any suggestions which you can make, eighar

through the columns of THE HORSELESS AGE or by letter, will be greatly appreciated. P. J. W.

[Without having seen the injured cylinder it is somewhat difficult to express an opinion on the possibility of a repair. We presume that the hole made by the valve head is in the cylinder head and not in the wall of the cylinder. The only question then is whether it is possible to get at the break with the torch. If the cylinder has a removable jacket cover plate it is probably quite accessible, but if there is only a plugged hole in the top of the water jacket it may be impossible to properly get at the broken place. If the point can be reached a reliable repair can be made.—ED.]

## Responsibility of Owner Who Lends His Car.

Editor Horseless Age:

In your issue of May 26, 1909, there was an editorial on "Legal Responsibility for Chauffeur's Acts." I am interested in the question, and would like you to send me the names of the different cases on the subject. I should like especially to read the cases holding that an automobile owner is not legally responsible for the acts of a person to whom he has loaned his automobile, such as his son or his daguhter.

I have been a subscriber to your magazine for several years, and would be very much obliged for the information.

E B COLKET

[We have looked over our files for cases of the kind referred to and find the fol<sup>3</sup> lowing:

Where a daughter nineteen years of age was accustomed to use an automobile, asking permission when her father was at home, but sometimes taking it without permission when he was not at home, it was held that the relation of master and servant did not exist where she was not driving other members of the family, but was using the machine as a means of recreation and pleasure for herself and her own friends.—Doran vs. Thomsen, N. J. 71, Atl. 296.

An owner of an automobile is not liable for an injury caused by the negligent driving of a borrower, if the machine was not used at the time in the owner's business.—Doran vs. Thomsen, 66 Ht. Rep. 897; Beaverman vs. Hart, 105 N. Y. S. 107.

Where the owner or person in possession of an automobile merely permits another to use it, the latter does not thereby become the agent or servant of the former, so as to charge the one with the other's negligence—Lewis vs. Amorous, 59 S. E. Rep. 238.—Ed.]

#### Queries.

Editor Horseless Age:

I would be pleased to have the following questions answered in your columns:

I. What is the best way to locate air leaks between the carburetor and the inlet valve in a water cooled motor and at would be best way to remedy same?

- 2. What is best and safest way to warm up the carburetor and inlet manifold on a very cold day, when an electrical device is not available?
- 3. When it is impossible to heat a private garage or building in which a car is to be kept in the winter, wouldn't an air cooled car be better to operate than a water cooled car, when the car is to be used every day some weeks and two or three times a week at other times during winter?

  R. M.

[One of the best methods of locating a leak in the inlet system is to spread soap suds over the inlet pipe and its joints to the engine and carburetor, and then force air into the inlet pipe in some manner (by blowing into it with the mouth, for instance), when soap bubbles will be formed at the point of the leaks. Another method consists in passing a burning cigar or cigarette over the inlet pipe while the motor is running. At the points of leaks the smoke rising from the cigar will be drawn toward the leak.

The best method of repairing the leak cannot well be specified without knowing its nature. If it is just a pinhole in a drawn tube or cast manifold, it can easily be closed by solder, but if it is at the joints some other process may have to be resorted to. If you have once found the leak any mechanic will know how to repair it.

A good way to warm up the inlet pipe, and especially the carburetor, on a cold morning, to facilitate starting of the motor, is to soak a large rag in boiling water and to apply that to the carburetor and inlet pipe.

An air cooled car has less need of being kept in a heated garage in winter than a water cooled car. There is no danger of its being damaged when stored in an unheated barn, but, of course, the motor will be stiff in the morning and rather harder to start than if it was kept in a heated barn. Where a car is to be used almost continuously during the winter, the air cooling system offers decided advantages.—ED.]

#### The Saurer Motor Truck Company.

The Saurer Motor Truck Company, which was recently incorporated under the laws of New Jersey, with a capital stock of \$200,000, and with Albert T. Otto as president and W. D. Sargent as one of the incorporators, has made arrangements with the Q. M. S. Company, of Plainfield, N. J., whereby the machines will be manufactured and assembled at these works. The company plans to begin business at once by importing immediately 150 complete chasses, as well as the parts for 150 more. which will be assembled in Plainfield, and then gradually take up the manufacture of the entire truck. The main office of the company will be in the Motor Mart, 1878 Broadway, New York, where parts will be kept in stock and all ordinary repairs made.

#### New Factory for Breeze Carburetors.

The Breeze Carburetor Company, of Newark, N. J., are building a reinforced concrete factory for the manufacture of their carburetors, strainers, check valves, etc. Two months ago they purchased a building site on South street, between Jefferson and Pacific streets, comprising about 25,000 square feet. The machine shop alone will cover about 10,000 square feet and will increase their present capacity tenfold. The new factory will be completed some time in January. The company's offices have recently been moved from 276 Halsey street to 14 William street, and the space vacated by the removal is now being used for manufacturing purposes.

## The Electrical Show at Madison Square Garden.

At the electrical show which is now being held at Madison Square Garden, New York, are exhibited quite a number of automobile accessories, as well as some few electric automobiles. The Studebaker Company exhibit a 5 ton truck, with double motor equipment, and also an 850 pound delivery wagon. This is equipped with an ampere hour meter. These meters have been tried out by this company, and are said to have given remarkably good results in service.

The Lansden Company, of Newark, N. J., also show a couple of electric vehicles, a light delivery wagon, and also a new pattern of depot or dock truck. This machine is designed for handling goods in factories, on large docks and in warehouses, and is equipped with only three small wheels. Two of these trucks are at present in use at the Hoboken station of the Lackawanna Railroad for handling baggage.

Stanley & Patterson are exhibiting their line of wireless batteries and boxes, as well as a line of automobile accessories. The General Electric Company show their mercury vapor rectifier for charging batteries. Another part of their exhibit which is featured consists of 6 volt tungsten lamps for automobile lighting.

The American Electric Lamp Company also show a line of 6 volt tungsten lamps for this purpose, and also a special switch by means of which the side and tail lights alone can be lighted or these together with the searchlight.

One of the most interesting exhibits is the Murphy electric rectifier, made by the company of that name, located at Rochester. N. Y. This machine is of the type operated by a synchronous motor, but the method of commutating the current is quite ingenious, the purpose being accomplished by purely electrical means. One feature of the device is that the voltage delivered can be regulated at will up to the full capacity of the transformer, and that without the use of resistance coils. A remarkably high efficiency is claimed for this device.

The greater portion of the exhibits are, of course, only of indirect interest to the motorist.

# Commercial Applications



#### Los Angeles Motor Express Lines. By W. V. Woehlke.

Within the last nine or ten months Los Angeles has awakened to the possibilities of the motor truck in the express and freight business, and is making up for its belated awakening by the rapidity with which motor trucks find buyers and users. Conditions around Los Angeles are as nearly ideal for the profitable employment of motor trucks as it is possible for them to be. The city is surrounded by more than a score of suburban towns, with populations ranging from 2,000 to 30,000. The roads are fair, oiled highways predominating, and within a year most of the suburban towns will be connected with Los Angeles by a system of excellent roads now under construction at a cost of \$3,500,000. These new roads will materially reduce the cost of operating and maintaining commercial vehicles, and a boom in the motor truck business will probably follow their comple-

Eight months in the year not a drop of rain falls on the roads, and the balance of the year the drivers have to contend only with rapidly drying mud on those roads lacking an oiled surface. Snow and ice are unknown, and the garages and storages places do not have to be heated, and may be of the lightest construction, so long as they keep the rain out.

#### CAUSE OF BACKWARDNESS.

The delay in the introduction of the motor truck in Los Angeles was mainly due to the enormous business in pleasure cars—a business that fully occupied the energies of the agents, and prevented them from venturing into a new field. When once the ice was broken and one firm was demonstrating to prospective buyers the advantages of the motor truck and to other agen-

cies the profits of the business, others fell into line and sales multipled. Within the last four months over twenty motor trucks were sold, and in the last six weeks agencies have been established for half a dozen different makes.

Of the twenty-odd towns around Los Angeles but four are so far served by motor express lines. Of the four lines one makes its headquarters in Los Angles, delivering in the suburbs of Santa Monica, Ocean Park, Venice and way stations, while the other three lines come from Pasadena, Long Beach and Santa Ana to Los Angeles all of them touching intermediary points. All of them formerly employed horses for the work the motor trucks are doing. The shortest line is the route covered by the Pasadena Transfer and Storage Company, operating between Pasadena and Los Angeles, a distance of 10 miles. The Pioneer City and Suburban Delivery Company runs a line 16 miles long to Santa Monica and other beach points, while the Long Beach Transfer Company covers a distance of 22 miles between the two points. The Santa Ana Transfer Company has the longest haul, 33 miles. Transfer companies of four other towns are at present negotiating for the purchase of motor trucks to replace their horses.

#### PICKING UP AND DELIVERING,

All of the trucks pick up their loads at one end without assistance, delivering in the same manner. Thus the Pioneer City and Suburban truck delivers and picks up all its load at the points it touches, while in Los Angeles only the bulky portions of the load are delivered and collected by the truck, light delivery cars and teams collecting and distributing the balance. The Pasadena, the Long Beach and the Santa Ana express lines, on the contrary, have assistance in picking up and delivering in their home towns, and none for the Los Angeles end, though all of them have headquarters with Los Angeles concerns for the receiving of orders.

#### PIONEER COMPANY'S SERVICE.

The express line from Los Angeles to the beach towns of Santa Monica and Venice, operated by the Pioneer City and Suburban Delivery Company, has been in existence the longest of any of the undertakings. The truck, a 21/2 ton Reliance car, with a two cycle, water cooled engine, developing 30 horse power, with a maximum speed of 25 miles, started in service almost five months ago, and has made daily trips with the exception of two days when it was laid up for repairs, owing to an attempt to change the circulation pump. Before the truck was put into service five horses were necessary. One team was used on the outgoing and the second team on the return trip, with the extra horse as substitute to give one of the other four a day of rest every week. With the horses the trip of 16 miles was made in two hours and a half. A ton was the limit of the load. The truck makes the trip in one hour and ten minutes, carrying loads varying from 900 to 3,500 pounds. It makes from fifty to ninety stops for delivery per day, and besides the towns served by the teams, it has extended its field into Palms, Sawtelle, Soldiers' Home, Ivy and other places. The average length of the distance covered daily is 55 miles, and the cost of operation and maintenance, according to Manager Ramsey, is slightly less than the cost of the teams,

#### CATERS TO EXPRESS SHIPPERS.

The truck does not carry heavy, bulky freight. The line caters principally to the express shippers, and comes into direct competition with the Wells-Fargo Express Company. All the towns touched are connected with Los Angeles by trolley lines, over which the Wells-Fargo has the exclusive express privilege. The minimum charge per package on the Wells-Fargo is 25 cents, with 10 and 15 cents added for delivery, according to the distance, making the lowest rate 35 cents in all. The truck's lowest rate is 15 cents per package, with no delivery charges, and this reduction is at-



Pasadena Transfer and Storage Company's 2 ton truck in front of Los Angeles office, with outgoing load.



Motor truck of Pioneer City and Suburban Delivery Company, with partial return load.

tracting the attention of shippers. The firm calculates that the average outgoing load pays all expenses of operation and maintenance, including the wages of driver and helper, and that the return load represents the profit. In consequence it is endeavoring to work up a return business, and has met with success, suburban shippers having discovered that, besides lower charges, the truck gives more regular and faster service than the express company, the goods going out the minute they are delivered to the truck, while they may lie from twelve to sixteen hours in the express office before being transferred to the cars.

#### LACK OF RESERVE EQUIPMENT FATAL.

About a year ago another firm started in the express business between Los Angeles, Santa Monica, Ocean Park and Venice with a motor truck, enjoyed good patronage and profits, and then disappeared from the field. The failure was due to several causes. The firm made a flat rate of 11 cents per 100 pounds freight, collected and delivered, in an endeavor to compete, not only with the express service, but with the freight department of the electric road as well. Even at this low rate the truck paid expenses when the freight was not too bulky in proportion to the weight; but when, for instance, half a ton of breakfast food filled the entire truck, the firm lost money. To avoid this condition the firm built up a good trade in perishable goods, such as meats, fruit, etc., at higher rates, but it was wrecked through the lack of reserve equipment. Regular service is the prime condition in moving perishable goods, and when the truck went out for repairs, with no other truck to take its place, the enterprise failed.

#### COMMERCIAL GARAGE SERVICE.

To make possible the successful operation of a single truck by one firm, the manufacturers of the truck, through their Los Angeles agency, have made arrangements with buyers for reserve equipment. The agency, the Pioneer Commercial Automobile Company, furnishes garage service for all the trucks it sells at rates below the average of public garages. The service includes storage, washing and polishing. If, during the first year, repairs are necessary through defective parts, faults of construction, etc., the agency makes the repairs free of charge, and during the time required for the work furnishes a truck gratis to take the place of the one out of commission. If the breakage is due to the fault of the driver a reserve truck is furnished at a rate less than the cost of a team for the same period. Wherever possible repairs are made at night to have the truck ready again in the morning.

The Pioneer City and Suburban Delivery Company is owned by H. C. Fuller, who also owns the Pioneer Trucking Company. Besides the 2½ ton truck on the Santa Monica express line, he operates a 3½ ton Reliance truck for long distance heavy hauling. running from Los Angeles to all the

bs up to a distance of 40 to 50 miles.

Before the advent of the truck horses were used on these long hauls, the firm charging \$1.50 per hour for their services. Even at his own rate the service was not profitable to the owner since, in his own words, "the long hauls were horse killers." While the operating and maintenance expenses of the freight truck are about the same and no higher rate is demanded, the service now shows a profit, besides giving the firm reserve equipment for the express line.

#### DELIVERY CARS PROVED TOO LIGHT.

Besides the two trucks, Fuller has been operating four one cylinder light delivery cars. He handles a large portion of the suburban delivery of almost all of the Los Angeles department stores, but the delivery cars will be disposed of as soon as possible. They were found to be too light for the demands made upon them, and are to be replaced by trucks. Department stores will not hand over their delivery to an outside concern unless that concern performs the service at least as cheaply as the department store could with its own equipment. The margin of profit for the delivery company, therefore, must be narrow if it wants to get the business, and the volume of the business must be large if the delivery company is to make a profit. In consequence the light delivery cars, put on the hardest, longest routes, of course, have to travel fast and make numerous stops in order to pay expenses. They were equal to the task, but nevertheless the upkeep proved too expensive on account of the hard usage they necessarily received.

The two trucks and the four light delivery cars are stored in the garage of the Pioneer Commercial Automobile Company, a subsidiary concern, fully equipped with drill press, engine lathe, forge, emery wheel and small tools, together with a line of parts. It is the intention of the concern to double its garage space, and make a bid for a portion of the commercial vehicle business that is rapidly growing up in Los Angeles

The trucks are equipped with solid tires, 36x5 inches on the front wheels and 36x7 inches on the rear set. Both the tires and the chains are guaranteed by the manufacturers for 5,000 miles. Though both trucks have exceeded this mileage, no replacement has been necessary so far.

#### PASADENA EXPRESS LINE.

The route of the Pasadena express line, operated by the Pasadena Transfer and Storage Company, H. G. Cattell and John C. C. Oy owners, covers a much shorter distance. The distance between Los Angeles and Pasadena is approximately 10 miles, with a steady grade almost threequarters of the distance from Los Angeles to the other end. The firm operates two two-cylinder Rapid trucks, one of I and the other of 2 tons capacity. The trucks make one trip a day, collecting their load in Los Angeles and delivering it at the storehouse in Pasadena, where it is broken up and delivered, partly by the truck not on the long trip and partly by horse ve-

hicles. According to the size of the load, the I or the 2 ton truck is sent out. If no stops are made at either Highland Park or Garvanza, the trip usually lasts an hour. Including the collecting and delivering of the loads, the daily average of the trucks is 45 miles. Paying loads are carried both ways as a rule, though the return trip usually shows the lighter amount of business.

## THE LONG BEACH WAREHOUSE AND TRANSFER COMPANY.

though its 2 ton Rapid truck has been in service but two months, has come to the conclusion that self propelled trucks, as compared to horse drawn vehicles, are a success and a paying investment, and the company will probably replace more of its horses with motor trucks. The truck running between Long Beach and Los Angeles, a distance of 22 miles over indifferent though almost level roads, performs work for which formerly six horses were required, and these six horses had difficulty in handling loads that are often exceeded by the truck. Including two stops for water, the truck makes the trip to Los Angeles in two to three and a half hours, according to the size of the load. Household goods and furniture constitute the main items of the loads, though a good deal of express matter is carried. Like all the other motor truck lines running to Los Angeles, the Long Beach truck has to compete with the freight and express service of the electric road, the railways and a number of transfer companies using horses. The truck is stored in the company's barns, minor adjustments and repairs being made at the shop of the selling agency in Los Angeles.

#### SANTA ANA TRANSFER COMPANY.

The longest haul of the motor lines established around Los Angeles so far falls to the 2 ton Rapid truck of the Santa Ana Transfer Company, which has to cover a round trip 60 miles long daily. Loads of general merchandise and household goods are carried either way, with the usual competition.

With all the motor truck lines gasoline and oil have been the chief items of expense. The next few months, with their rains, mud and rutted roads, will be the crucial test, but the experience of one of the lines last spring seems to indicate that the trucks will stand the test if carefully handled by competent, experienced drivers. The average distance for I gallon of gasoline on all of the lines varies between 3 to 7 miles, according to the load and the grade. None of the lines kept an accurate record of either the gasoline or the oil consumption, the owners relying upon a rough computation of the total monthly cost and receipts to compare the efficiency and earning capacity of the motor vehicles with the cost and profit of the service rendered by horses.

#### LACK OF EXPERIENCED DRIVERS.

The main trouble in the operation of the motor trucks has been the difficulty of find-

ing experienced drivers for them. To surmount this obstacle one of the selling agencies agrees to furnish experienced drivers, or, if the buyer prefers, a man selected by him will be put into the shop for five or six weeks before he is sent out with a truck, accompanied by a mechanic. Another agency instructs prospective drivers for one or two weeks in its shop. Drivers of pleasure cars are loath to enter the commercial field. The change means too much work, not only on the driver's seat but also in handling the load. Still, those drivers who have made the change are satisfied. They have to work only a stated number of hours, with no one to find fault while they are on the road, and with opportunities to work up to better positions, opportunities wholly lacking in the average position as driver of a private touring car.

Practically all the bodies of the trucks as furnished by the factory proved to be too narrow. In consequence one of the selling agencies has installed facilities for the manufacture of bodies, receiving only the chassis and the motor from the factory and building a body to suit the requirements of the buyer.

#### Motor Mail Wagons in Philadelphia.

The Philadelphia post office is now using five motor wagons for the collection of packages and mail in the northern and northeastern sections of the city. This service was started on October I and the five motor wagons replaced ten of the old horse drawn vehicles. The vehicles, one of which is herewith illustrated, were built by the Autocar Company, of Ardmore, Pa. They consist of one of the regular Autocar commercial chassis, on which is mounted a body built to the specifications of the United States Government.

#### More Cars for Milwaukee Fire Department Officials.

Chief T. A. Clancy, of the Milwaukee (Wis.) fire department, has chosen the Palmer & Singer for responding to alarms, and the Mitchell touring car, purchased by the city two years ago, will be used by the first assistant chief. The Palmer & Singer is a six cylinder, 60-90 horse power touring car, of five passenger capacity, and tests in Milwaukee brought out a speed of 63 miles an hour. The car cost \$4,347, not quite up to the appropriation of \$4,500 made by the Milwaukee Common Council. Every assistant chief in Milwaukee will be furnished with an automobile in order.

#### Commercial Notes.

The city of Portland, Ore., has purchased a Chalmers-Detroit automobile for the use of City Health Officer Wheeler.

The city of Tacoma, Wash., has appropriated \$5,000 for an automobile hose wagon for the fire department, and \$2,500 for an automobile for the fire chief.

An automobile route has been established between Enumclaw and Auburn, Wash., comprising a portion of the distance between Tacoma and Seattle. The promoters of the enterprise are Dr. Smith, S. L. Sorensen and P. Kulberg.

The city of Augusta, Ga., has accepted the motor fire wagons furnished it by the Webb Motor Fire Apparatus Company, of Vincennes, Ind.

An automobile ambulance will be provided for the use of the sheriff's office at Milwaukee, Wis. The sheriff already has a touring car for the use of deputies, but finds an ambulance just as necessary.

Councilman A. J. Stoddard, of Seattle, Wash., has introduced a bill for the appropriation by the city council of a sufficient sum to properly letter all automobiles owned by the city. In this way it is hoped to put a stop to their illegal use for other purposes.

A motor propelled ambulance has been placed in service in Dallas, Tex. It was constructed in the Gallaway garage and Brooks carriage shop in Dallas. A second ambulance of improved construction is at present being built there, which will be used as a private ambulance by the Taxicab Company, and will answer calls for the sanitariums and for physicians.

There are now twenty-six automobiles in use by the various departments of the Boston city government. The police and fire departments have six cars each, the street cleaning department has three, the water and bath departments have two each, while the building, engineering, hospital, park, public grounds and schoolhouse departments get along with a single vehicle each.

An automobile service is at present being established from Lubbock to Emma and Crosbyton in the panhandle of Texas. At Crosbyton the line will connect to Floydada by way of Dickens, and also with the new town of Spur. Another automobile line has just been completed from Lubbock to Brownfield, which will probably be extended by way of Monument, N. M., to Barstow, Tex. Another line will soon be

established between Lubbock, Tahoka, Post, Fluvana and Lamesa.

#### Oscar Lear Company May Be Sold.

A number of parties have been negotiating for the plant of the Oscar Lear Automobile Company, Springfield, Ohio, which company has been in the hands of a receiver for over a year. Among those who have been mentioned as endeavoring to get control of the plant are E. S. Kelly, of Springfield, and the General Motors Company, the latter of which are reported to have purchased the stock of W. A. Miller, of Columbus, and to hold an option on that of Oscar Lear.

#### Insurance Rates Rising.

Writers of automobile insurance throughout Illinois, especially in the Chicago district, are trying to agree to raise the premium from 2 to 2½ per cent. Thus far the Chicago agencies have not been able to secure the advance, although it is becoming general throughout the State.

#### Road Makers' Convention.

Arrangements have been practically completed for the largest good roads congress ever held in America, which will take place at Columbus, Ohio, October 26 to 29, when the American Road Makers' Association. the Ohio Good Roads Federation and the Ohio County Commissioners' Association hold a joint meeting. It is expected that 3,500 or more delegates will be in attendance from every section of the country. One of the features of the meeting will be the attendance of special delegates from most of the States in the Union. Governor Harmon has named delegates for Ohio. To aid in the entertainment the Franklin County Good Roads Association has been organized, with a preliminary membership of 130. E. A. Peters is president and William M. Maize secretary. Special committees have been named to look after the entertainment of the delegates.



AUTOCAR MOTOR MAIL WAGON, FIVE OF WHICH ARE IN USE IN PHILADELPHIA.

#### The Brighton Beach Twenty-four Hour Race.

While the third and final twenty-four hour race of the season held by the Metro-politan Racing Association at Brighton Beach on last Saturday may not have been all that could be desired from a financial standpoint, from the viewpoint of racing it certainly was a great success. In the first place the track was in such fine condition that not only was the usual recess for the repair of the track deemed unnecessary, but the competition was so keen that

the records of the track for every hour except the sixteenth and seventeenth were badly shattered. This was, perhaps, due as much to the exceptional care taken with the lighting arrangements as to the condition of the track. The honors of the day went to a Lozier car driven by Mulford and Patschke, which covered 1,196 miles, or 19 miles more than the former record of 1,177 miles established by

George Robertson in a Simplex. To make the Lozier victory complete second place was secured by the other entry of that make, driven by Cobe and Seymour, which covered 1,169 miles. At the starting line were lined up nine of the eleven original entries, two of which had been withdrawn. The starters were as follows:

	Machine.	Drivers.	Drivers.				
1.	Withdraw Palmer &	n, Singer Howard, Knipper	a				
	2000	Lescault.					

. Withdrawn.

8. Rainier ......Owen and Bowers.
9. Rainier ......Dearborn, Disbrow and Lund,
10. Marion ......Strang, James and Plan-

agan.

The cars were started promptly at 8 o'clock by Dr. Cook, the Arctic explorer, and although at times the race seemed to be assured to one car or another, there was always a struggle for position, and at no time did the race lack interest. At the start the Buicks made the pace, and keeping close together steadily increased their lead



LOZIER NO. 3, WINNER OF THE RACE.

on the field. In the second hour No. 6 Buick had tire trouble and No. 5 gained a lead of about 3 miles, but at the end of the fourth hour Chevrolet, the driver of No. 6, regained this lead, and held it till the thirteenth hour, when, owing to a broken rear axle, he dropped back to sixth place. This accident cost him about an hour, and he immediately tried to make it up, but evidently the accident had weakened the machine, and he was forced to retire in the seventeenth hour with a broken steering knuckle, having covered in all 764 miles.

The first serious trouble happened during the fifth hour to the Palmer & Singer, which broke the right front steering wheel spindle, which caused the wheel to fly of and strike a woman, fortunately without seriously injuring her. This caused a delay of about two hours and a half, and put the car in the last position. In the tenth hour this car was forced to retire, having burned out a connecting rod bearing. Toward the end of the eleventh hour the Rainier No. 8, which up to that time had been fourth, while going down the home stretch burst a tire, ran into the infield fence and turned turtle. The mechanic and driver both

jumped, the former being only slightly injured, while the driver, Bowers, had his skull fractured.

From that time on very few changes occurred in the relative standing of the cars. The Logier No. 4 led up to the seventeenth hour, but at this point a steering knuckle broke and the machine plunged through the infield fence. Furtunately, however, no further damage was done, and after about a quarter of an hour

the machine was going again, but it had lost the lead to its team mate, No. 3. Just before this happened Seymour, who at the time was driving No. 4, was closely pursuing the Marion into the home stretch. In rounding the turn the Marion skidded and turned completely around. Only by a quick turn of the steering wheel was Seymour able to avoid a bad accident. It is, of course, barely possible that this sudden strain may have been more or less directly the cause of the accident which happened only five minutes or so later. This seventeenth hour was somewhat eventful, for the Matheson, with Basle driving, also broke a steering gear and plunged through the infield fence.



GENERAL VIEW OF CAMPS AT BRIGHTON BEACH

However, none of the contestants was injured and the machine was again in the running after about three-quarters of an hour, with its relative position still unchanged. During the last hour of the race the motor of this car slowed down and finally seized, so that the machine did not finish.

There was a special prize offered for the greatest number of miles during the last hour made by any car which had started. It was announced that this was won by the winning Lozier No. 3. The two leading cars were equipped with Diamond tires.

The finishes of the race and the number of miles covered are given in the following table:

ositio	n. N	ło.	Car.					Miles.
1.	No.	3	Lozier		 	 		1,196
2.	No.	4	Lozier		 	 		1,169
3.	No.	9	Rainier	٠.	 	 		1,115
4-	No.	5	Buick		 	 		1,064
5.	No.	10	Marion		 	 	٠.	904

The arrangements were remarkably good from the point of view of the spectator. The score boards were large and could be read from the grand stand without the aid of an opera glass. The boards were numbered from right to left. The camps were in the infield, extending from the beginning of the home stretch to the score boards. They were also placed numerically from right to left and prominently numbered. It was thus easy to see at a glance what cars were at any time laid up for repairs or replenishments.

A rather remarkable feature of the race was the large number of steering gear breaks, and the fact that none of the contestants was injured thereby. It is probable that in high speed track racing much greater continuous strain is put on these parts than in any other class of work, road racing not excepted.

#### The Louisville Reliability Contest.

The Louisville (Ky.) A. C. held a two days' reliability run from Louisville to Winchester, Ky., and back on October 8 and 9. The cars started from Louisville at 6 o'clock a. m. and reached Winchester the same evening shortly after 6 o'clock, they being met about 5 miles out of the city by a delegation of the Winchester A. C. During the evening an informal luncheon was given at the Elks Hall by the Winchester Club to the tourists. The contesting cars were divided into five classes according to selling price, and the running time was different for each class.

On Saturday the return run to Louisville was made. Upon the return to Louisville all the cars were subjected to an examination by a technical committee. It was found that the Rambler No. 3, entered and driven by Prince Wells, and the Rambler No. 12, entered by August Ropke, both came into the end control with perfect scores and tied for first honors in the reliability contest. The tie will probably be run off at a future date.

The cup offered for the car showing the createst economy in the consumption of

gasoline, oil and water was won by Ira S. Barnett (Cadillac No. 1). The Prince Wells prize for the Rambler making the best showing was won by Harry Rooke. The Maxwell trophy donated by the Maxwell-Clark Motor Car Company and the Buick Trophy offered by the Hubert Levi Auto Company were won by Mrs. Harvey Myers, of Covington, Ky., who drove a Buick. The Cadillac prize offered by the Kentucky Automobile Company was awarded to R. E. Gregory. The C. C. Stoll prize. for the least amount of oil consumed during the trip, was also awarded to R. E. Gregory. The Kentucky Consumers Oil Company's prize, consisting of 25 pounds of non-fluid oil, was awarded to Mrs. Harvey Myers. The Owners' trophy offered by the Louisville Automobile Club for the best showing in the reliability run was awarded to Bertram Strauss (Rambler)

## Conditions of Vanderbilt Race

The supervisors of Nassau County, New York, granted their permission for the running of the Vanderbilt Cup race under certain conditions, among which are the following: The race must be run between the hours of 5 a. m. and 5 p. m. on October 30. The contestants have the privilege of practicing on the course between the hours of 5 and 8 a. m. daily from the time of acceptance of conditions made by the board of supervisors. The Motor Cups Holding Company must sprinkle the Massapequa road with oil, repair the old country road and make it safe; bank the turns on the roads with sand a foot high on the outer edges; guard and police the course during the practice periods and on the day of the race, and as is deemed necessary by the county sheriff; it must also put up a bond of \$100,000 to indemnify the county supervisors and sheriff against any damage suits that may grow out of accidents; it must further deposit a sum of \$500 with the county treasurer for the repair of the roads after the race. It is further stipulated that if any entrants are arrested and convicted of speeding during the practice periods they and their machines must be disqualified from taking part in the race.

#### Vanderbilt Cup Race News.

At the time of going to press twenty entries had been received for the Vanderbilt Cup and concurrent races which are to be held on October 30. Of these, thirteen entries are for the Vanderbilt race, five for the Massapequa trophy race, and two for the Wheatley Hills trophy race. The entries will close on October 25, and it is expected that at least thirty cars will be entered. Seven entries were received on Monday, including a Buick, to be driven by Louis Chevrolet, three Maxwells, entered by Carl Kelsey, two Marmons, and an American Roadster. The first cars to put in an appearance on the track for practicing were two Chalmers-Detroits, which

are to be driven by William Knipper and Joe Matson, respectively.

There has been some grumbling among the drivers over the fact that no cash prizes are offered to drivers in the contest for the Vanderbilt Cup, while \$1,000 cash prizes are offered to the winning drivers in the contests for the Wheatley Hills and Massapequa trophies. It is argued that inasmuch as the entry fee for the Vanderbilt Cup race is twice that for the two minor events, a cash prize might well have been offered to drivers in the more important event. The course will be open for practice every morning from 5 to 8 o'clock, until the day of the race. The timing and scoring are to be attended to by the New York Timers Club, with whom arrangements have been made by the Motor Cups Holding Company.

#### Automobiles in Brazil.

The effect of the prevailing depression on the imports of automobiles into Brazil is shown in the following report from Consul General George E. Anderson, of Rio de Janeiro:

"The general depression which has been manifest in most lines of the import trade in Brazil during the past few years has been very marked in the imports of automobiles. The imports in 1907 amounted to 363 machines, valued at \$663,144, and in 1908 to 297, valued at \$551,682. For the first six months of 1909 the imports amounted to only 118, or at the rate of 236 machines for the year, a loss of about 20 per cent. over last year. The machines imported from the United States in 1907 numbered 54, valued at \$89,215; in 1908, 43, valued at \$71,441, and only 14 for the first six months of 1909. Of the total of 207 automobiles imported from all countries in 1908, France furnished 139, Italy 51, the United States 43, Great Britain 36, Germany 20, and other countries 8. In the first six months of 1909 the total was composed of 52 from France, 20 from Italy, 14 from the United States, 14 from Germany, 6 from Great Britain, and 12 from other countries.

"The relative gain in the imports from Germany during the six months ended June 30, 1909, is due to good agency work in the face of a depressed market. Dealers say that the German machines, which are largely for trucking work, are sold at low prices, all things considered, and that they represent efforts to keep factories going in the face of unfavorable conditions rather than profitable business.

"For passenger purposes the favorite cars still seem to be those from France and Italy. This, however, is largely due to superior agency and repair shop arrangements. The American cars here are well liked, on the whole, and the sale of the higher grade American cars, particularly, could be increased if the agents here were prepared to properly care for them after they are sold. "General trade conditions in Brazil are gradually recovering."



## Misstatement Does Not Invalidate Insurance Policy.

A suit to recover from an insurance company under an automobile insurance policy was decided in the Common Pleas Court in Baltimore, Md., on October 8, in favor of the plaintiff. The suit was brought by William P. Cummings against the British and Foreign Marine Insurance Company, Ltd., of Liverpool. According to the testimony Mr. Cummings, through his private secretary, purchased a touring car and insured with the company for \$1,500, paying a premium of \$60. In the application for the insurance the automobile is stated to be a 1007 car. No. 2,048, and Mr. Cummings' secretary testified that this information was given him by the man from whom he purchased the car. The machine was kept in a garage by Mr. Cummings from the time of the purchase until April 24 last, when it was destroyed by fire while being used by Mr. Cummings'

The insurance company raised the point that the automobile was a 1906 instead of a 1907 model, and that they would not have insured a 1906 car for the same amount, but would have charged a greater premium, and that the value of the car had been greatly overestimated. The company alleged that the policy was void by reason of the misrepresentations in the application for insurance. Counsel for complainant argued that inasmuch as the policy contained no clause declaring it to be void in the event of incorrect representations in the application for insurance, the court could not construe a representation to be a warranty unless the intention to create a warranty be expressed upon the insurance policy or the application, and that the representations, even if incorrect, were not such as to vitiate the policy, but would only permit the excess premium that would have been charged for insuring a 1906 car to be pleaded as a set-off, and as no plea of set-off was filed in the case evidence along these lines should not be permitted.

The court refused all the instructions asked by the company and granted those asked by attorney for complainant. The jury promptly brought in a verdict for the full amount of the policy, with interest to date, less the present value of the car, as shown by the testimony, the verdict being for \$1.430.

## Auto Liability Insurance Void in Iowa.

Attorney General Byers of Iowa has upheld the State Insurance Department in its ruling that risk companies cannot insure automobile owners against liability for ac-

cidents caused by their machines, except when the person injured is an employee of the owner.

The Attorney General submitted his opinion at the request of State Auditor Bleakly. He holds with the Auditor that the laws of Iowa give insurance companies no authority to write such insurance. Such an interpretation of the law will work no hardship on automobile owners, says Mr. Byers, because its only effect will be to make them more careful in operating their machines.

## Wisconsin Oil Inspection Law Sustained.

The Wisconsin oil inspection law has been sustained in the Circuit Court in Milwaukee, after a hard contest was made against it by the Wadhams Oil and Grease Company, of Milwaukee, which objected to paying a fee of 10 cents per barrel for inspection services. The case will go to the Supreme Court. A suit brought against Thomas B. Jeffery & Co., of Kenosha, Wis., to enforce the law, has been dismissed. The law covers the inspection of lubricants, gasoline and oils of various kinds. E. L. Tracy is the State inspector.

#### Jacksonville Taxes Taxicabs.

The city council of Jacksonville, Fla., has passed an ordinance requiring all public service automobiles to be licensed, and imposing a license fee. The license fees for the different classes of vehicles are as follows:

Autos and taxicabs up to five passengers.. \$12.50 Autos and taxicabs, six to ten passengers.. 50.00 Sightseeing cars, ten to fifteen passengers.. 100.00 Sightseeing cars, fifteen to twenty passen-

Sightseeing cars, over twenty passengers... 200.00

The ordinance went into effect on Octo-

#### Injunction in Tire Litigation.

Judge Slater, at Cincinnati, on October II, granted to the complainant in the case of the Goodyear Tire and Rubber Company vs. the Rubber Tire and Wheel Company and Consolidated Rubber Tire Company, an injunction pendente lite, enjoining the latter from instituting and maintaining any action against any of complainant's customers who buy and handle, use or sell its patented rubber tire.

## Owners Responsible for Joy Riding Accidents in Ohio.

A joy ride in a motor car owned by R. G. Wallace and F. C. Gillett cost the owners \$150 recently, in a suit before Justice Bostwick in Columbus, Ohio, who awarded damages in that amount to Ray Coulter, who was injured in the mad ride. The car was driven by a friend of the owners, but the action was brought against the owners under the section of the Ohio law which establishes the financial responsibility in joy riding cases.

## Wisconsin Signboard Law to Be Enforced.

Town boards in Wisconsin are not hastening to comply with a new law requiring them to erect and maintain suitable guide posts in the main traveled highways. The law gives them until November 1 to comply, and if posts are not erected within a reasonable time the Wisconsin State A. A. intends to compel enforcement of the law.

#### Legal Notes.

The upper house of the Kansas City Council has been considering an ordinance which provides that no garage or stable shall be built within 25 feet of a residence not owned by the party putting up the building, and that buildings of this class must be set 50 feet back from the sidewalk. Objection was made to the inclusion of garages in the provisions of the ordinance, as garages are kept clean and are absolutely inoffensive. The ordinance was referred to a committee.

A protest has been lodged with the Board of Estimate of Baltimore, Md., against the installation of a 200 gallon gasoline tank in connection with the new garage on Mt. Royal avenue and McMechen street by residents of the neighborhood. They claim that the installation of this tank would endanger life and property in the vicinity. The matter was placed in the hands of Building Inspector Preston and Chief Horton, of the fire department, who will report to the board on October 26.

#### Good Roads Convention and Race Meeting in New Orleans.

A model road is being constructed by the State of Louisiana from New Orleans to Baton Rouge, the State capital. It is stated that in the city of New Orleans there is at present considerable activity in the way of street improvements and the construction of new boulevards. To arouse further interest in the subject, a good roads convention has been called by Governor Sanders of Louisiana and the New Orleans Progressive Union, to take place in New Orleans, on November 19. The convention is to be followed by a track race on November 20-21, under the auspices of the New Orleans A. C. The events include a 5 mile race for cars of 301 to 450 cubic inches piston displacement, a 50 mile race for five classes of cars according to the A. A. A. classification. a six hour race for the same cars, and two 5 mile and two 10 mile races for local chauffeurs and amateurs.

#### Business Trouble.

A petition in bankruptcy has been filed against the Stevens-Britton-Maure Company, manufacturers' agent for automobile supplies, machinery, etc., at 1783 Broadway, New York, by these creditors: Albert F. Britton, \$1,800; Walter W. Robinson, \$6: Benjamin M. Asch, \$6.

## **Exhibitors at Grand Central Palace**

Final diagrams for the Tenth International Automobile Show, which opens New Year's Eve in Grand Central Palace. New York, under management of the American Motor Car Manufacturers' Association, show seventy-two makers of American cars and fifteen importers of foreign cars with six additional American cars on the waiting list, making a total of ninety-three makers of automobiles. This is by far the greatest number of automobile concerns ever brought together in any show held in New York.

Members of the Motor and Accessory Manufacturers totalling 110 will draw for space for the Palace Show on October 22. These, together with 104 accessory concerns not affiliated with the M. & A. M. and twelve on the waiting list, bring the grand total up to 319 exhibitors in the Palace Show. Following is a list of the motor car exhibitors who have been allotted space in the Palace Show:

#### AMERICAN CARS.

American Motor Car Co., Indianapolis, Ind. American Motor Truck Co., Lockport, N. Y. Allen-Kingston Motor Car Co., New York, N. Y. Atlas Motor Car Co., Springfield, Mass. Austin Automobile Co., Grand Rapids, Mich. B. C. K. Motor Car Co., York, Pa. Bartholomew Co., Peoria, Ill. Black Manufacturing Co., Chicago, Ill. Brush Runabout Co., Detroit, Mich. Buckeye Manufacturing Co., Anderson, Ind. Cartercar Co., Pontiac, Mich.
Carter Motor Car Corp., Washington, D. C.
Chadwick Engineering Works, Pottstown, Pa. Chase Motor Truck Co., Syracuse, N. Y. Cameron Car Co., Beverly, Mass. Coates-Goshen Co., Goshen, N. Y. Columbus Buggy Co., Columbus, Ohio. Crawford Automobile Co., Hagerstown, Md. Dayton Motor Car Co., Dayton, Ohio. Demotear Sales Co., Detroit, Mich. Empire Motor Car Co., Indianapolis, Ind. Fal Motor Co., Chicago, Ill. Ford Motor Co., Detroit, Mich. Gaeth Automobile Co., Cleveland, Ohio. Grabowsky Power Wagon Co., Detroit, Mich. Gramm-Logan Motor Car Co., Bowling Green, Ohio. Hart-Kraft Motor Co., York, Pa. Holsman Automobile Co., Chicago, Ill. Houpt, Harry S., Manufacturing Co., New York, N. Y. Hupp Motor Car Co., Detroit, Mich. Interstate Automobile Co., Muncie, Ind. Jackson Automobile Co., Jackson, Mich. Jewel Carriage Co., Carthage, Ohio. Kissel Motor Car Co., Hartford, Wis. Lansden Co., Newark, N. J. Lion Motor Car Co., Detroit, Mich. McCue Co., Hartford, Conn.
McIntyre, W. H., Co., Auburn, Ind.
Mack Brothers Motor Car Co., Allentown, Pa.
Martin Carriage Works, York, Pa. Maxwell-Briscoe Motor Co., Tarrytown, N. Y. Metz Co., Waltham, Mass. Metzger Motor Car Co., Detroit, Mich. Middleby Auto. Co., Reading, Pa. Midland Motor Co., Moline, Ill. Mitchell Motor Car Co., Racine, Wis. Moline Automobile Co., East Moline, Ill. Moon Motor Car Co., St. Louis, Mo.
Mora Motor Car Co., Newark, N. Y.
Nagant Automobile Co., New York city, N. Y.
National Motor Vehicle Co., Indianapolis, Ind. Nordyke & Marmon Co., Indianapolis, Ind.

Oakland Motor Car Co., Pontiac, Mich. Otto, A. T., New York city, N. Y. Otto Sales Co., Philadelphia, Pa. Paterson, W. A., Co., Detroit, Mich. Pennsylvania Auto. Motor Works, Bryn Mawr, Pa. Pierce Motor Co., Racine, Wis. Premier Motor Manufacturing Co., Indianapolis. Ind.

Rapid Motor Vehicle Co., Pontiac, Mich. Randolph Motor Car Co., Chicago, Ill. Regal Motor Car Co., Detroit, Mich. Reo Motor Car Co., Lansing, Mich. Schacht Manufacturing Co., Cincinnati, Ohio. Seitz Automobile Co., Detroit, Mich. Simplex Motor Car Co., Mishawaka, Ind. Sharp, Wm. H., Co., Trenton, N. J. Speedwell Motor Car Co., Dayton, Ohio. St. Louis Car Co., St. Louis, Mo. Streator Motor Car Co., Streator, Ill. Sultan Motor Car Co., New York, N. Y. York Motor Car Co., York, Pa.

#### FOREIGN CARS.

American Zust Auto. Co., New York. Benz Auto Import Co., New York. Bowman Automobile Co., New York. Brewster & Co, New York. C. G. V. Import Co., New York. De Dion-Bouton Selling Branch, New York.
De Dietrich Import Co., New York.
Delahaye Import Co., New York. Fiat Automobile Co., New York. Hotchkiss Import Co., New York. The Hol-Tan Co., New York. Isotta Import Co., New York. Panhard & Levassor, New York. Renault Frères Schling Agency, New York. S. P. O. Automobile Co., New York.

## Automobile Exhibitors at Atlanta

Automobile Show. Peerless Motor Car Co., Cleveland, Ohio. Olds Motor Works, Lansing, Mich. Pierce-Arrow Motor Car Co., Buffalo, N. Y. Winton Motor Carriage Co., Cleveland, Ohio. Woods Motor Vehicle Co., Chicago, Ill. Mitchell Motor Car Co., Racine, Wis. H. H. Franklin Manufacturing Co., Syracuse, N. Y. Stevens-Duryea Co., Chicopee Falls, Mass. Maxwell-Briscoe Motor Co., Tarrytown, N. Y. Dayton Motor Car Co., Dayton, Ohio. Packard Motor Car Co., Detroit, Mich. Pope Manufacturing Co., Hartford, Conn. Cadillac Motor Car Co., Detroit, Mich. Moon Motor Car Co., St. Louis, Mo. Cartercar Co., Pontiac, Mich. Brush Runabout Co., Detroit, Mich. St. Louis Car Co., St. Louis, Mo. H. McIntyre Co., Auburn, Ind. Selden Motor Vehicle Co., Rochester, N. Y. Studebaker Auto Co., New York. Jewel Carriage Co., Cincinnati, Ohio. Speedwell Motor Car Co., Dayton, Ohio. Hupp Motor Car Co., Detroit, Mich. York Motor Car Co., York, Pa. Overland Automobile Co., Toledo, Ohio. Premier Motor Manufacturing Co., Indianapolis, Ind. Thomas B. Jeffery & Co., Kenosha, Wis. Reo Motor Car Co., Lansing, Mich. White Co., Cleveland, Ohio. Locomobile Co. of America, Bridgeport, Conn. Mora Motor Car Co., Newark, N. Y. Marion Motor Car Co., Indianapolis, Ind. Ford Motor Co., Detroit, Mich. Buckeye Manufacturing Co., Anderson, Ind. Bartholomew Co., Peoria, Ill. Pennsylvania Auto Motor Co., Bryn Mawr, Pa. F. B. Stearns Co., Cleveland, Ohio. Elmore Manufacturing Co., Clyde, Ohio. Nordyke & Marmon Co., Indianapolis, Ind. Chalmers-Detroit Motor Co., Detroit, Mich. Knox Automobile Co., Springfield, Mass. National Motor Vehicle Co., Indianapolis, Ind. Apperson Brothers Auto Co., Kokomo, Ind. Jackson Auto Co., Jackson, Mich. Babcock Electric Carriage Co., Buffalo, N. Y.

Hudson Motor Car Co., Detroit, Mich.

Austin Auto Co., Grand Rapids, Mich. Moline Auto Co., East Moline, Ill. Metz Co., Waltham, Mass. Baker Motor Vehicle Co., Cleveland, Ohio. Streator Motor Car Co., Streator, Ill. Sultan Motor Co., New York. Renault Frères, New York. Columbus Buggy Co., Columbus, Ohio. Fiat Auto Co., New York. Black Manufacturing Co., Chicago, Ill. Great Western Auto Co., Peru, Ind. Rauch & Lang Carriage Co., Cleveland, Ohio. Autocar Co., Ardmore, Pa.
Rapid Motor Vehicle Co., Pontiac, Mich.

#### SPACE ALLOTTED TO THE MEMBERS OF THE M. AND A. M.

MAIN FLOOR. Badger Brass Manufacturing Co., Kenosha, Wis. Fisk Rubber Co., Chicopee Falls, Mass. Veeder Manufacturing Co., Hartford, Coun. The B. F. Goodrich Co., Akron, Ohio. A. W. Harris Oil Co., Providence, R. I. Electric Storage Battery Co., Philadelphia, Pa.

United Manufacturers-C. A. Mezger, 1627 Broadway, New York. N. Y. and N. J. Lubricants Co., 165 Broadway, New York. Jones Speedometer Co., Broadway and Seventy-

sixth street, New York. Connecticut Telephone and Electric Co., Meriden, Conn. Weed Chain Tire Grip Co., 28 Moore street,

New York.

#### MEZZANINE FLOOR.

G & J Tire Co., Indianapolis, Ind. C. F. Splitdorf, 261 Walton avenue, New York. Goodyear Tire and Rubber Co., Akron, Ohio. Diamond Rubber Co., Akron, Ohio. Firestone Tire and Rubber Co., Akron, Ohio. Oliver Manufactufing Co., Chicago, Ill. Hartford Suspension Co., Jersey City, N. J. Gabriel Horn Manufacturing Co., Cleveland, Ohio. Republic Rubber Co., Youngstown, Ohio.
Jos. Dixon Crucible Co., Jersey City, N. J. Ajax-Grieb Rubber Co., Trenton, N. J. Kokomo Electric Co., Kokomo, Ind. Michelin Tire Co., Milltown, N. J. Empire Tire Co., Trenton, N. J. Federal Rubber Co., Trenton, N. J. Byrne, Kingston & Co., Kokomo, Ind.

#### SECOND FLOOR.

S. F. Bowser & Co., Fort Wayne, Ind. Sprague Umbrella Co., Norwalk, Ohio. Herz & Co., 203 Lafayette street, New York. Never-Miss Spark Plug Co., Lansing, Mich. Leather Tire Goods Co., Niagara Falls, N. Y. Dow Tire Co., 2000 Broadway, New York. C. A. Shaler Co., Waupum, Wis. Randall-Faichney Co., Boston, Mass. Stromberg Motor Devices Co., Chicago, Ill. Dayton Rubber Manufacturing Co., Dayton, Ohio. High Wheel Auto Parts Co., Muncie, Ind. Lavalette & Co., 112 West Forty-second street, New York.

Adam Cook's Sons, 313 West street, New York.

#### Accessories,

Charles E. Miller, New York. Post & Lester, Hartford, Conn. Cloud-Stanford Co., Atlanta, Ga. Rutherford Rubber Co., Rutherford, N. J. Chicago Wind Shield Co., Chicago, Ill. W. F. Polson, Buffalo, N. Y. Vehicle Apron and Hood Co., Columbus, Ohio. Shipman Instrument Co., Sunbury, Pa. Ajax Trunk and Sample Case Co., New York. Emil Grossman Co., New York.

Motorcycles.

Hendee Manufacturing Co., Springfield, Mass. Aurora Automatic Machinery Co., Chicago, Ill. Consolidated Manufacturing Co., Toledo, Ohio. Excelsior Supply Co., Chicago, Ill. Greyhound Motor Works, Buffalo, N. Y. N. S. U. Motor Co., New York.
Milton W. Arrowood Co., Atlanta, Ga.

#### GARAGE ITEMS



Garage Firm Stops Tipping.

The day of the gratuity in the garage and shop of the Greer-Robbins Company, Mitchell agents in Los Angeles, is past. A customer desiring to have his car washed and polished well or speedily no longer is confronted by the open hand, besides the bill. The order against the tip has gone forth, and instant dismissal is the penalty for the acceptance of the unearned increment.

The firm's customers appreciate the innovation. When one of them offered the usual gratuity to the washer and the silver was refused, he gasped, examined the coin closely, and remarked that it was a perfectly good one, whereupon the washer explained that tips in this garage were a relic of the past. Three days later the man who could not get rid of his tip had the showroom of the building converted into a dining room, and invited the fourteen garage and shop employees to an eight course banquet, with all the necessary trimmings, to show his appreciation.

Indianapolis Auto Row.

By November 1 Indianapolis will have a new automobile row, when the Conduitt Building in North Delaware street is expected to be completed. The building is a one story brick structure, and has been divided into a number of rooms designed especially for automobile salesrooms. It is within a square of Massachusetts avenue, which for some years has been the centre for many automobile agencies. Companies that have leased quarters in the new building are Finch & Freeman, representing the Richmond, Auburn and Rider-Lewis; the Peck Motor Car Company, representing the Cadillac: the Conduitt Automobile Company, having the Knox agency, and the State Automobile Company, Indiana agents for the Oakland.

#### Isotta on the Pacific Coast.

The Motor Car Import Company, of Los Angeles, has closed a contract with the American representatives of the manufacturers of the Isotta-Fraschini car, and has obtained the agency for the product of Italy for the Pacific Coast States, where heretofore no foreign make was adequately represented. C. F. Fenner, formerly the agent for the White steamers in Southern California, is the head of the Import Company, which will also handle the Halladay line.

#### New Idea in Garage Valuation.

Tax Commissioner F. B. Schutz, of Milwaukee, is planning for what he terms an "all-year" valuation of automobile garages. He would not make assessments in the springtime of each year, when garages are well stocked, as is at present the practice. He believes that at that period demonstrators crowd the garages and that it is not fair to the agents and dealers to tax them on a temporary basis at a time when they get the "short" end of it.

#### Garage Notes.

NASHVILLE, TENN.—Howard Cregor & Co. will open a garage at 135 Third avenue.

IOI.A, KAN.—John T. Wood is building a one story brick automobile repair shop at Sycamore and Madison avenue.

NEWCOMB, N. Y.—Archer M. Huntington is constructing a stone garage at Arbutus Lake Preserve, to cost \$15,000.

RHINELANDER, WIS.—J. H. Morgan has plans for the establishment of an auto livery at 22 South Stevens street.

BUFFALO, N. Y.—Wm. J. Statler, of 202

Anderson place, is having plans drawns for the erection of a garage on Bidwell Parkway.

PORTLAND, ORE.—The Firestone automobile

PORTLAND, ORE.—The Firestone automobile agency has secured garage quarters with the Graham Motor Co. at Fifteen and Washington streets.

NEW BEDFORD, MASS.—Plans for the building of a 48x56 foot, one story cement block garage on Harrison street north of Hickory street, are in the hands of W. L. Sturtevant.

WATERBURY, CONN.—The Board of Safety has awarded a contract for the erection of a new garage for the police auto patrol to Bergen & Sons, that firm being the lowest bidder.

& Sons, that firm being the lowest bidder.

BAY CITY, MICH.—Peter Oswald has bought a building site on Walnut and Vermont streets, on which he will erect a garage building which will be completed for occupancy by February next.

MACOMB, ILL.—Ewing & Deems have closed a deal for the purchase of property on the east side of South Randolph street, on which they will erect a two story 50x120 feet fireproof garage.

KANSAS CITY, MO.—A permit has been granted to Mrs. Mary C. Wilder for the erection of an 80x160 foot two story garage at 922-926 East Fifteenth street. The estimated cost is \$20,000.

LOUISVILLE, KY.—Thomas King, who operated a livery stable on Guthrie street, has sold all his horses, and has remodeled his establishment into a spacious garage. He has taken the agency for the American Traveler.

agency for the American Traveler.

SAN ANTONIO, TEX.—Herman and Paul Eikel have organized the Eikel Auto Co. to handle the Jackson car. They have secured headquarters at 427 Main avenue. They hold the Jackson agency for the whole of southwestern Texas, and will establish sub-agencies.

CLEVELAND, OHIO.—The Barger Automobile Co. expect to move into their new garage and salesroom at 1632 Euclid avenue about November 1. In addition to offices and salesroom on the first floor a large repair shop will be established in the basement.

AUGUSTA, GA.—The Augusta Auto Garage and Supply Co. at a meeting held on October 6 elected the following officers: C. B. Garrett, president; Jos. H. Day, vice president, and Frank G. Bohler, secretary, treasurer and general manager. Fred Perroux will be manager of the mechanical department.

CHICAGO, ILL.—The E. R. Thomas Motor Co., of Buffalo, N. Y., has secured a fifteen year lease on the property at the northeast corner of Michigan avenue and Twenty-third street, and will erect a three story building at an estimated cost of \$75,000. The terms of the lease call for a rental approximating \$175,000.

rental approximating \$175,000.

NEW YORK, N. Y.—The garage of the Joseph Loughran Co. at 1170 Fifth avenue, between Ninety-eighth and Ninety-ninth streets, was destroyed by fire on October 14. Two chauffeurs were in the garage at the time the fire started, and it is stated that one of them knocked over a candle on the oil soaked floor, though it seems

rather strange that a candle should be used in a garage. The damage is estimated at \$20,000, and includes the value of four taxicabs which were ruined by the fire.

SPRINGFIELD, MO.—Rountree & Estes will open a garage in the new building nearing completion on South Jefferson street near Walnut street as soon as it is ready for occupancy. The new concern will have 100x100 feet of floor space.

GREEN BAY, WIS.—J. C. Zimmer and H. C. Malchow, of Oshkosh, have leased the auto and garage business formerly owned by Gotfredson Brothers on Jefferson street. The building is to be improved. It is their purpose to rebuild and paint cars, and part of the second story will be used for this purpose.

GRAND FORKS, N. DAK.—The Burgess-Whitcomb auto agency has been taken over by Beek & Florin, of Lakota, who have changed the name to the Dakota Auto Co. E. D. Hanson, who had charge of the mechanical department of the old concern, will continue in the same capacity with the new firm.

LOS ANGELES, CAL.—The firm of Miller & Williams has opened headquarters at 1140 South Olive street, and will handle the Pullman car. The firm consists of Roger H. Miller, who has been connected with the Tourist factory in Los Angeles for the past two years, and Geo. M. Williams, formerly a member of the firm of Rentou & Williams, auto dealers.

OMAHA, NEB.—A contract has been let for the erection of two brick garage buildings on the C. E. Perkins estate on Farnam street, between Nineteenth and Twentieth streets, at a cost of \$15,000. The building will be one story, with a total frontage of 97 feet. The Buick Automobile agency will occupy one of the buildings, and the Omaha Auto Co. the other.

ATLANTA, GA.—The Olds-Oakland Co. will occupy a garage building within a few months, for which the contract has just been let. The building will be 50x100 feet, four stories high, of reinforced concrete construction. It will be located at the corner of Cone and James streets, and the entire front of the first floor will be of glass, to permit of properly displaying the cars handled.

ALBANY, N. Y.—Plans for an addition to the Albany Garage Building on Howard street were filed this week in the Bureau of Buildings. The new structure will be 80x47 feet, four stores and basement. The garage will have two entrances, one on Howard street and one on William street. An elevator will render possible the storage of automobiles on the third and fourth floors.

TOLEDO, OHIO.—The Twenty-first Street Garage is to have an 80x220 addition to its present building. The rear portion of the new building will be two stories high, and will contain a large repair shop. The present garage will be given over entirely to display, storing and caring of cars. A. B. Hanson, who was formerly local sales manager for the Pope Motor Car Co., has been put in charge.

PITTSBURG, PA.—A new garage is to be crected at the corner of Grant boulevard and Craigh street, for which plans are now being drawn by E. A. Dyche. It is to be four stories on Craig street and two on the boulevard. The floor dimensions will be 135x136 feet, and the cost is estimated at \$50,000. The building will be ready for occupancy about March 1 next, and is to be used by a new taxicab company.

PITTSBURG, PA.—The Standard Automobile Co., Pittsburg, Pa., has let the contract for a four story steel and reinforced concrete garage building on Grant boulevard, which is to coat about \$135,000. It will have a frontage of 250 feet on Grant boulevard and 70 feet on Bellefield avenue. The building will have a gray brick and terra cotta exterior. It is to be finished by April 1, 1010. The first floor will contain the salesroom, tire department, garage and general offices. The second floor will be used as a stock and trinming department; the third floor will be given over to upholstering, wood working, paint

ing, etc., while on the fourth floor will be the toll, repair and blacksmithing departments.

CARLSBAD, N. M.—A \$6,000 garage is being erected for W. M. Kerr.

BARKER, N. Y.—E. R. Featherston is completing a two story garage on Quaker avenue.

ST. JOHNSBURY, VT.-F. S. Harriman will open a garage on Central street in the near future.

LORAIN, OHIO.—Dewey Moore will open a garage in the old Schnitzler Building on Tenth street.

FULTON, KY.—I. H. Read and C. E. Webb are considering the erection of a two story garage and salesroom.

CALUMET. MICH.—The Superior Motor Co., a new concern, has opened a garage and sales-room for the Buick.

COLUMBUS, OHIO.—The Price Implement Co., of Zanesville, Ohio, has added a line of automobiles to its stock.

MOORESTOWN, N. J.—The garage of Henry Pew was badly damaged by fire last week. The cause of the fire is unknown.

MINNEAPOLIS, MINN.—M. R. Waters & Sons have moved into their new garage at 1332 and 1334 Nicolet avenue, near Grafit street.

CLEVELAND, OHIO.—The Barger Automobile Co., Cadillac agents, are moving into their new garage and salesroom at 1628-1632 Euclid avenue.

BUFFALO, N. Y.—A permit has been granted to the Babcock Electric Carriage Co. for the erection of an addition to its garage on West Utica street.

DENVER, COL.—Fry & McGill are equipping an automobile repair shop in the rear of the Majestic Building. They will make a specialty of repairing lamps.

MINNEAPOLIS, MINN.—The Four Traction Motor Co., of Mankata, is to open a garage in this city at 33 Tenth street S. E. B. Pakers will be manager.

PITMAN, N. J.—Last week a fire broke out in French's garage, badly damaging the building and destroying a car owned by C. B. Tichenor, which was in the building.

DALLAS, TEX.—The Alamo Automobile Co.

DALLAS, TEX.—The Alamo Automobile Co. have opened a salesroom at 319 Commerce street, and will handle the Stoddard-Dayton line. J. J. Gorman is manager of the company.

SAN FRANCISCO, CAL.—A permit has been granted to Cuyler Lee for the erection of a three story concrete garage on the corner of Jackson street and Van Ness avenue, to cost \$60,000.

OMAHA, NEB.—The Mid-West Automobile Co., who handle the Cole "30," expect to locate shortly in a suitable garage on Nineteenth and Farnam streets. R. A. DeWitt is manager of the company.

KANSAS CITY. MO.—Work has been commenced on a two story 45x125 foot garage for the Rambler branch on Fifteenth and Harrison streets. The building will be ready for occupancy December 1.

COLUMBUS. OHIO. — The Maxwell-Briscoe Motor Co., of North Tarrytown, N. Y., have opened a distributing agency in a new building recently completed by John C. McCahran at 62 East Spring street, Columbus, Ohio.

VIRGINIA, MINN.—The Range Motor Co. have just purchased two lots 50x100 feet, on which they will erect a two story and basement fireproof garage. The new building will not be ready for occupancy before the early spring.

MINNEAPOLIS, MINN.—Walter H. Grower has bought the auto repair business of J. M. Murphy, located at 830 Hennepin avenue. Mr. Grower was formerly traveling expert for the Studebaker Automobile Co. at Chicago.

COLUMBUS, OHIO.—The garage of William F. Wagner at Massillon, Ohio, was damaged to the sum of \$5,000 by a fire October 13, which gutted the building. Firemen worked in a shower of sparks which fell on several barrels of gasoline.

GRAND FORKS, N. DAK.—F. H. Haviland has assumed the management of the Grand Forks branch of the Dakota Auto Co., who handle the Reo and E-M-F. The other members of the firm,

R. H. Beek and S. A. Floren, will reside at Dakota.

WASHINGTON, IA.—Lytle Brothers, a new firm, is to open a garage in the near future. In the meantime they will exhibit a line of Studebaker cars at the Frank Bell Carriage Works. In connection with the garage they expect to carry a full line of automobile supplies and accessories.

ESCANABA, MICH.—Thomas Richter, who has conducted a livery business for many years, has disposed of his horses and carriages, and will go into the automobile business. Plans have been drawn for a garage to occupy the site of his stables. He will handle several leading lines.

WAVERLEY, IA.—Clark & Mitchell are to open a garage in the Dawson Building on East Bremer avenue. Part of the building will be fitted up as a salesroom, where they will handle the Buick, Overland, Reo and Studebaker cars. Later on they will establish an auto livery service.

SYRACUSE, N. Y.—Melvin W. Kerr, manager of the Syracuse Buick branch, will resign on November 1 and become a member of the new Kerr-Doane Motor Co., who will handle the American Simplex and the Velie cars. The members of the new company, which is shortly to be incorporated, are Melvin W. Kerr, president; James Doane, secretary and treasurer, and Fred C. Beckwith.

PHILADELPHIA, PA.—A fire occurred in the garage of the Philadelphia and Merion Transit Co. on Sixty-third street and Columbia avenue last week, destroying the whole building and a large sightseeing automobile valued at \$4,500. Another machine of the same kind was saved. Boys playing with matches were seen nearby, and it is supposed that the fire was the result of their carelessness.

SALT LAKE CITY, UTAH.—Work has been commenced on a new brick garage to be built for Oscar and James Moyle on State street, south of the Utah Independent Telephone Co.'s Building. The new building, which will be 76½x247 feet, will consist of four stories and basement, and will be constructed so that three additional stories can be added. The estimated cost is \$40.000.

RUTLAND, VT.—L. H. McIntyre, L. A. Perkins, T. W. Maloney and others are organizing a company to take over the fireproof garage conducted by Burdick & Smith on Willow street, and the garage of L. A. Perkins & Co. on Strongs avenue. The Willow street garage will be used as a repair shop and showroom, and the Strongs avenue garage as a storeroom. The same line of cars that was handled by Mr. Perkins will be continued by the new company.

DENVER, COL.—The Studebaker Automobile

Co. has secured a lease on the new building which is to be erected by Charles Schleter on Cheyenne street, between Fifteenth and Sixteenth streets. The company will occupy the building as a sales-room, and not as a garage. It is to be equipped with electric elevators, and will have a plate glass front. The property was bought by Mr. Schleter for \$50,000, and the new building, which is to be two stories high and have walls of sufficient strength to admit of adding two stories later on, will cost \$25,000.

UTICA, N. Y.—George H. Norris, secretary and treasurer, and T. Harvey Ferris and C. H. Norris, directors, have resigned from the Utica Motor Car Co., 333-337 Bleecker street. George H. Norris has been elected vice president, and Hon. James S. Sherman and Sherrill Sherman have been elected directors. George H. Norris will in future devote his entire attention to the Syracuse branch of the company, known as the Genesee Motor Car Co., of which he is president. The Utica Motor Car Co. handles the Peerless, Cadillac and the Stevens-Duryca.

NEW YORK CITY.—Harold W. Bush and Willard M. Lyon, proprietors of a garage at 415 West 150th street, were held last week in the Harlem Police Court by Magistrate Krotel for examination on the charge of maintaining a nuisance. Some of the immediate residents of the neighborhood complained that they had to move because they could not get a decent night's

sleep, and J. C. Tierney, who owns an apartment house adjoining the garage, testified that he had lost three tenants because of the constant noise of the machines during the night.

AUBURN, ME.—Jonas Edwards & Son have the contract to build a large garage on Union street.

ELDORA, IA.—J. H. Hadley will soon erect a garage on the property lately purchased by him on Marion street.

BINGHAMTON, N. Y.—Work has been begun on a new concrete garage for B. W. Livingston & Son on Baldwin street.

BAKER CITY, ORE.—A. E. Tunnecliffe and W. A. Halliday have formed a partnership, and will handle the Hudson cars.

NEWARK, N. J.—The Newark Auto and Engineering Co. will build a \$6,000 garage and salesroom at 316 and 318 Broad street.

RUTLAND, VT.—W. C. Landon & Co. will soon begin the work of converting two stores in the Duffy-Chaffee block on Evelyn street into a garage.

OMAHA, NEB.—Chas. Merz, of Indianapolis, and H. E. Wilcox, of Casey, Ill., are to open a garage on Farnum street, between Twenty-fourth and Twenty-fifth streets.

PHILADELPHIA, PA.—Howard L. Haines has let the contract to build a 65x154 feet, one story stone and brick garage on the south side of Spring Garden street west of Twenty-second street. The approximate cost is said to be \$10,900.

#### New Agencies.

Utica, N. Y.—Davis & Clark, Oldsmobile.
Los Angeles, Cal.—C. C. Slaughter, Stearns.
Atlants, Ga.—Interstate Sales Co., Interstate.
Wausau, Wis.—L. H. Hall, Chalmers-Detroit.
Calumet, Mich.—Wieder Harness Co., Maxwell.
Syracuse, N. Y.—Willis & Van Brunt, Oakand.

Detroit, Mich.-J. B. McIntosh Auto Co., Lambert.

Winston-Salem, N. C .- The Motor Co., Stude-baker.

Pittsburg, Pa.—McAlister Motor Car Co., Cadillac.

Brooklyn, N. Y.—C. T. Silver, 62 Flatbush avenue, Overland.

Walla Walla, Wash.—J. H. and M. H. Paxton, Chalmers-Detroit.

Grand Forks, N. Dak.—The Dakota Auto Co., Reo and E-M-F.

Detroit, Mich.—Overland Sales Co., 295 Jefferson avenue, Overland.
Syracuse, N. Y.—Fred A. Marshall & Son, 231

Jefferson street, Hupmobile.

Los Angeles, Cal.—Motor Car Import Co.,

Isotta-Fraschini and Halliday. Kansas City, Mo.—The E. R. Hunnewell Motor

Car Co., 3816 Main street, Lozier.
Portland, Ore.—The White Motor Co. of Ore-

gon, White steam and gasoline cars.

Binghamton, N. Y.—Chenango Motor Sales
Co., Overland, Marion and Speedwell.

Minneapolis, Minn.—La Crosse Implement Co. (and automobiles), Imperial and Deal.

Cleveland, Ohio.—Euclid Auto Sales Co., Fire-stone-Columbus and Columbus Electric.

Denver Col.—Report & Williams 1889 Clerk

Denver, Col.—Bennett & Williams, 1530 Clarkson street, Palmer-Singer and Simplex.

Duluth, Minn.—The Russell Motor Co. (embracing Wisconsin, Minnesota and upper Michigan), Fal.

Brooklyn, N. Y.—Bishop, McCormick & Bishop, 20 Halsey street, Ford. (For the whole of Long Island.)

New York, N. Y.—Imperial Motor Vehicle Co., 212 West Seventy-sixth street (and surrounding territory), Grout.

Calumet, Mich .-

H. P. Clauson, Studebaker, E-M-F.

The Michigan Garage Co., Chalmers-Detroit. Portland, Ore.—

Ballou & Wright, Indiana.

Thompson-Cuthbert Motor Co., Speedwell. D. M. Smith, Packard.

Neate & McArthur, Locomobile and Oakland. Fred Gumpert, Regal and California Tourist.



In Enid, Okla., there are now 115 automobiles. The city levies a tax of \$2 per year on each car.

The Ohio Electric Car Company, recently organized at Toledo, will have their office and works at the Milburn Wagon Company plant.

The Prest-O-Lite Company, of Indianapolis, have established a branch in Minneapolis, at 109 Tenth street South, in charge of V. M. Heeth.

The Simplex Automobile Company call attention to the fact that the car which won the Fairmount Park race is the Simplex made in New York city.

The Automobile Dealers' Association of Los Angeles, Cal., which held a show in February last, has decided to hold another one the last half of December.

The I. H. C. motor buggies of the International Harvester Company will in future be manufactured in the plant of the Buckeye Mower and Reaper Company, Akron. Ohio.

The Brush Runabout Company, of Detroit, have reduced the price of their little single cylinder runabout to \$485, and decided on an output of 10,000 for the coming season.

The Phoenix Auto Supply Company have opened a branch in Kansas City at 2005 East Fifteenth street, in charge of Mr. Thayer, Western distributor for the Stepney spare wheel.

The annual convention of branch managers of the Buick Motor Company was held at Flint, Mich., last week. About thirty representatives of the company from all parts of the country attended.

A. P. Heney, of the Heney Auto Company, Aberdeen, S. Dak., has sold the business to Geo. F. Spaulding, of Minneapolis. Mr. Spaulding will have the agency for Halladay cars in South Dakota.

The third annual show of the San Francisco dealers was opened in the Emporium Building on October 16, and will continue during this entire week. The show will conclude on Saturday with the Alameda and Portola road race.

The General Motors Company is reported to have purchased the Jackson-Church-Wilcox plant in Saginaw, Mich. The latter company manufactures automobile parts, and recently increased its capital stock to \$60,000. A new factory building was recently completed.

The Rae Electric Vehicle Company, of which H. K. Parkman is president and H. C. Welch, of Boston, treasurer, are planning to locate in Charlestown, Vt., if \$40,000 of the company's capital stock of \$250,000 can be placed there. The company claims to have an electric automobile that

will travel from 125 to 150 miles on one charge.

The Diamond Rubber Company, of Akron, Ohio, has ordered a huge power unit from the Allis-Chalmers Company, of Milwaukee. It consists of a steam turbine of 1,250 kilowatt capacity for power for individual motors.

The Broc Carriage Company, of Cleveland, Ohio, will not make any changes in their electric model for 1910, except an increase in the wheel base to 80 inches. The company plans to increase its capital stock by \$50,000 to enable it to conduct its business on an enlarged scale.

The Taxicab and Automobile Company, which was recently organized in Salt Lake City, Utah, have secured the agency for the Cartercar, and plan to have twenty-five taxicabs of that make in operation in the near future. They have also secured the agency for the Thor motorcycle.

F. Kaplan was elected president of the reorganized E.-Z. Auto Go-Cart Company, of Monroe, Wis. D. S. Klafter, of Chicago, was elected vice president; George Thorpe, Monroe, secretary, and Louis Kohli, Monroe, treasurer. The plant was recently enlarged and removed from Beloit, Wis.

A newly organized co-operative association of automobile owners in Battle Creek, Mich., has made a bid of \$1,400 for the assets of the defunct American Motor and Cycle Company of that city, which bid will probably be accepted. The claims of creditors against the company amount to \$10,-857.05.

C. P. Kimball & Co., of Chicago, manufacturers of vehicle bodies, whose present plant is located on the corner of Michigan boulevard and Gorman court, have bought a property at Michigan boulevard and Thirty-ninth street for \$77,500, and will immediately begin the erection of a modern body factory.

J. McA. Johnson has secured control of the Kinsler-Bennett Company, of Hartford, Conn., and has been elected president and treasurer of the concern. The other officers of the firm are G. B. Kinsler, general manager, and Shiras Morris, secretary. The company manufactures universal joints and other auto parts.

Hugh Chalmers, president of the Chalmers-Detroit Motor Company, who gave a lecture on salesmanship before the City Club of Boston last spring, has accepted an invitation to speak at the retail trade dinner of the Boston Chamber of Commerce, which will be held at the Hotel Somerset on October 28.

The Dallas (Tex.) Automobile Dealers' Association are holding their first annual automobile show in the armory, October 18 to 30. Two street parades are features of the show, one being a trade parade and the other a parade for private owners. Prizes for the best decorated cars are offered in both of the parades.

The Pierce Motor Company, of Racine, Wis, which recently increased its capitalization to \$300,000 in order to enter the

automobile manufacturing field more extensively, will not become a unit of the General Motors Company as reported. Officers deny the reported action.

Automobile dealers and private owners gave a sociability run from Indianapolis to French Lick on October 16. Twenty cars made the run and a silver cup was awarded to the driver arriving at the control closest to a secret schedule. A hill climb was held at French Lick, Saturday afternoon, the prize being a silver cup given by Thomas Taggart.

The Irvin Manufacturing Company, Indianapolis, manufacturers of automobile tops, have begun the erection of a factory building in that city. It will be located in McCarty street, near Capitol avenue, and will be a two story brick structure, 56x140 feet. The building will cost \$14,000. The company is now located in the Industrial Building.

The Washington, D. C., dealers have appointed a show committee, with Chas. E. Miller, of Charles E. Miller & Brother, as chairman, and have decided to hold a show in Convention Hall during the week of January 24, immediately following the Madison Square Garden Show in New York. There will be 28,000 square feet of floor space available, and an elaborate scheme of decoration is contemplated.

The Great Southern Automobile Company is being organized in Birmingham. Ala., with a capital stock of \$100,000 and the following officers: E. F. Enslen, president; Ike Adler, vice president; John J. Kyser, secretary and treasurer, and E. F. Enslen, Jr., general manager. The new company have secured a property formerly used as a cotton mill, and will engage in the manufacture and repair of automobiles.

The H. H. Franklin Manufacturing Company, of Syracuse, N. Y., is now making and marketing its cars on a schedule fixed at the beginning of the season. The arrangement permits the purchaser to contract for a delivery date. Inspection of the schedule shows him on what date the car will be turned out at the factory and shipped to him. The dealer sells a certain automobile for delivery at a specified time just as if he had the machine complete and in his salesroom.

The Rauch & Lang Carriage Company, electric vehicle manufacturers, of Cleveland. Ohio, have just completed a two story extension of their machine shop on West Twenty-second street. The building is of brick, with a saw tooth roof, and measures 60x112 feet. Two other factory buildings, each about 60x112 and four stories high, are in course of erection. The top floor of one of these buildings is to be provided with a saw tooth roof, and will be used as a varnishing room.

The Los Angeles Motor Racing Association have leased Ascot Park, which is said to be one of the best equipped mile tracks in the country. They have already begun extensive alterations. Negotiations are being conducted with the Warner Instru-

ment Company regarding the use of their automatic timing instrument in timing the races on this track.

Ground for the new factory buildings of the Fiat Automobile Company, at Poughkeepsie, N. Y., was broken on October 11.

It is reported from Macon, Ga., that H. K. Burns, T. O. Parker and J. A. Smith will incorporate the Burns Motor Car Company with a capital stock of \$10,000.

William H. Durphy, sales manager of the Chase Motor Truck Company, of Syracuse, N. Y., was in Des Moines, Ia., the past week with the object of establishing an agency there.

The capital stock of the Phannstiel Electrical Laboratory, North Chicago, Ill., has been increased from \$30,000 to \$50,000, and additional machinery will be installed to push a magneto developed by Mr. Phannstiel

Walter J. Allen, 3 West Forty-fourth street, New York, will market a new car to be known as the Allen-Kingston, Jr., which is to be manufactured by the G. J. G. Motor Car Company, of White Plains, N. Y.

George Robertson, driving a Simplex car, covered 5 miles in 5m. 37s. on the Point Breeze (N. J.) race track on last Saturday afternoon in a race with L. J. Bergdoll and Willie Houpt, both in Thomas cars. In a run against time Robertson drove one mile in 1m. 5s.

The Benz Auto Import Company of New York have received a cable announcing that Hemery, driving a Benz car, established another world's record at Brussels by driving a kilometer from a standing start in 31 1-5s. The former record was 32 2-5s., and was held by a Mercedes.

The Rainier Motor Company, of Saginaw, Mich., plan to market 500 large cars during the 1910 season, of which 200 have been assigned to New York, while the remainder will be marketed through new agencies now being established in various large cities. It is stated that the new model will be out next month.

The Gaeth Automobile Company, Cleveland, Ohio, are making extensive improvements to their factory and office. They have put new cement floors in their factory, increased the number and size of the windows, and installed considerable new machinery. The office is being entirely remodelled and refitted.

We are informed that the Rambler payroll now contains nearly 1,200 names, or about 300 more than the previous maximum. It is asserted that this year's business of Thomas B. Jeffery & Co., will surely break all previous records, and most of the cars being turned out are of the higher-priced grades, the average selling price being \$2,000.

The Inst Lighter Company, recently organized by Columbus men to place on the market an apparatus for lighting auto lights without the driver leaving his seat, has established an office and factory on East Main street, Columbus, Ohio. The device consists of a valve and electric spark which ignites the gas. Fred C. Bargar is president and W. H. Gardner is general manager.

The New York Trade Association held a special meeting on Tuesday with Gen. John T. Cutting in the chair. A special committee of three was appointed to revise the bylaws of the association to enable it to take a more active part in the conduct of automobile events in and around New York in the future. It is said to be planned to double the annual dues.

J. M. Quinby & Co., of Newark, N. J., the well known carriage and auto body builders, have acquired a controlling interest in the Isotta Import Company, 1633 Broadway, New York city. P. Fremont Rockett is manager of the company in New York. The company plans to establish agencies in all the larger cities, which is rather a novel move for an importing firm.

#### Club Notes.

The Texas Motor Club, of Dallas, Tex., is planning to buy a building site and establish a clubhouse and grounds. A committee was appointed some time ago, and a meeting was called for the purpose of taking definite steps in the matter.

The Asheville (N. C.) Motor Club was organized at a meeting held at the Y. M. C. A. in that city on October 9. The following officers were elected: E. C. Sawyer, president; Dr. C. B. Reynolds, vice president, and D. L. Jackson, secretary and treasurer.

The A. C. of Maryland held its annual meeting and election of officers at the clubrooms on Mt. Royal avenue on October 12. The following officers were elected: Howard Milliken, president; Osborne I. Yellott, vice president; Thos. G. Young, treasurer, and F. W. Darling, secretary.

The Hartford (Conn.) A. C., at a meeting held on October 11, decided to reduce the quorum of the club from thirty to fifteen. The proposed club run to the Vanderbilt Cup race was abandoned, owing to apparent lack of interest among the members. Hiram Percy Maxim gave an illustrated talk on his gun silencer.

The St. Louis A. C. is planning a two day endurance run for the Hagerman trophy and one other prize. The contest for the Hagerman trophy, which has been run twice before, has never been decided, as in the first contest all sixteen contestants finished with perfect scores, and in the second two cars tied for the trophy.

The Milwaukee A. C., at its annual meeting, decided to proceed with the clubhouse project, and work will be started early next spring on a reinforced concrete building, in rustic style, on the club's tract of 3 acres on the Blue Mound road, a trunk highway to the west of Milwaukee. Another acre will be purchased, giving the club one of the prettiest and best club house sites in the country. Clarke S. Drake

was re-elected president. F. Austin Prinz was elected vice president; George A. West, second vice president; A. C. Brenckle was re-elected secretary, and Lee A. Dearholt treasurer.

The Motor League of Rhode Island has approached the American Automobile Association with the object of affiliating with that organization. This move is said to be the result of the difficulties encountered by the league in connection with the proposed race meet at Providence, R. I., recently, which had to be abandoned.

The Huntingdon Motor Club is being organized at Huntingdon, Pa. Two meetings have already been held and a third meeting has been set for October 26. Already twenty-eight automobile owners have joined the club. The temporary officers are as follows: Wm. Reed, president; Robert J. Mattern, treasurer, and Chas. Vuille, secretary.

The New Jersey Automobile and Motor Club, of Newark, N. J., held its annual run on October 10 to Newburgh, N. Y., and back, which was participated in by about 100 persons. The members of the club left Newark about 9 o'clock a. m. and reached Newburgh, a distance of 60 miles, shortly after 12 o'clock. The return trip to Newark was begun at 2:15.

The technical committee of the Chicago Motor Club are considering the holding of another demountable rim contest. The first trial of this kind ever held was conducted by the Chicago club about a year ago. If it should be decided to repeat the contest the rules would probably be materially changed, and in addition to demountable rims other devices designed to economize time lost through tire troubles on the road would be admitted, such as detachable rims and spare wheels.

#### New Incorporations.

Suburban Motor Transit Co., Elizabeth, N. J.—Capital stock, \$50,000.

Paige-Detroit Motor Car Co., Detroit, Mich.—Capital stock increased from \$5,000 to \$100,000.
Gramm-Logan Motor Car Co., Bowling Green, Ohio.—Capital increased from \$100,000 to \$200,000.

Slip-over Tire Co., Marion, Ind.—Capital stock, \$3,000. Incorporators, John W. Fudge, Fred Gephart and Geo. M. Kocher.

Burns Motor Car Co., Macon, Ga.—Capital stock, \$10,000. Incorporators, H. K. Burns, T. O. Parker and J. A. Smith.

The Rhodes Motor Co., Duluth, Minn.—Capital stock, \$50,000. Incorporators, A. L. Rhodes, Frank Crassweller, Elmer F. Blu.

The Detroit Roller Bearing Co., Detroit, Mich.

—Capital stock, \$50,000. Incorporators, J. M.

Hibbard, R. M. Brownson and A. B. Hibbard.

The Rambler Auto Co., Indianapolis, Ind.—Capital stock, \$10,000. Incorporators, F. G. Kamps, Jr.; W. H. Jordon and A. J. Gardner.
Royal Garage and Taxicab Co., Atlantic City,
N. J.—Capital stock, \$125,000. Incorporators,

N. J.—Capital stock, \$125,000. Incorporators, Wm. H. Conn, Paul D. Royal and Chas. F. Sesinger.

The Decatur Motor Car Co., Decatur, Ind.— Capital stock, \$150,000, Incorporators, J. S. Bowers, M. E. Brackett, C. C. Schafer, L. A. Graham, M. Kirsch and W. J. Vesey.

The Buick Auto Supply and Garage Co., Saginaw, Mich.—Capital stock, \$100,000. Incorporators, Judge Wm. Glover, Mayor Geo. W. Stewart, ex-City Treasurer Geo. S. Lockwood, David B. Buick, Thos. D. Buick, Geo. B. Brooks, Wm. F. Paine and Fred E. Button.

The Royal Automobile Co., Minneapolis, Minn. -Capital stock, \$50,000. Incorporators, I. A. Thorson and E. J. Johnson.

The Dycus Auto Co., Dallas, Tex.-Capital stock, \$3,000. Incorporators, D. Dycus, Henry T.

stock, \$3,000. Incorporation.
Leslie and Oliver Nichols.
Scott Governor Spring Co., Springfield, Ill.—
\$25,000. Incorporators, Geo. N. Capital stock, \$25,000. Incorpora Scott, F. Harding, A. Stubblefield.

The Dunham-Yager Motor Car Co., Louisville, Ky.—Capital stock, \$12,000. Incorporato Dunham, Roy T. Yager and A. M. Dick. Incorporators, Geo.

The Allen Lamp Co., Atlanta, Ga.—Capital stock, \$25,000. Incorporators, E. E. Allen, A. Calhoun and oJhn T Dennis (automobile lamps).

Rambler Automobile Co., Indianapolis, Ind. Capital stock, \$10,000. Incorporators, Frank G. Kampa, W. H. Jordan and Arthur J. Gardner.

Cialer & Serison, Chicago, Ill.—Capital stock, 6,000. Incorporators, J. Serison, Edward Cialer and Chaa, Kramerer. Automobile and supply

Great Southern Automobile Co., Birmingham, Ala.—Capital stock, \$100,000. Incorporators, E. F. Enslen, Ike Adler, John J. Kyser, E. F. Enslen, Jr.

Northern Auto Pressure Gauge Co., Los Angeles, Cal.—Capital stock, \$10,000. R. J. Northam, L. K. Northam, W. E. Sandham and P. W. Schenck.

Ideal Electric Co., Chicago, Ill.—Capital stock. \$1,500. Incorporators, J. A. Ryerson, S. H. Peterson and M. Mathison. To manufacture and deal in automobiles, accessories and supplies.

#### Trade Personals.

Frank E. Jarvis, traffic manager for the C. I. Shoop Medicine Co., of Racine, Wis., for several years, has been selected for the position of chief purchasing agent of the Mitchell Motor Car Co.

John D. Murphy, until recently automobile editor of the Boston Herald, has become associated with the Frank Presbrey Co., New York, and will handle the automobile publicity placed with that company.

Edward F. Korbel has been appointed press agent of the Tenth National Automobile Show, to be held in Madison Square Garden, New York, as successor to Arthur Jervis, whose chief assistant he was at the former shows.

Raymond S. Joo, formerly connected with the B. F. Goodrich Co., of New York, is now New England manager of the Rainier Motor Car Co., with headquarters at Boston. He succeeded Geo. T. Gould, who established the Boston Rainier branch.

W. H. Yule, of Kenosha, Wis., has been appointed manager of the New York branch of the B. F. Goodrich Co. Mr. Yule has been connected with the Goodrich Co. for some time, having held a position in the golf ball department at the factory in Akron, Ohio.

H. A. Capron, manager of the Rhode Island Motor Car Co., of Providence, R. I., died on October 11 at Pawtuxet Neck, of a complication of diseases. Mr. Capron was a member of the Rhode Island Automobile Club and the American Automobile Association. He was fifty years of age, and leaves a widow and three children.

Ezra B. Kirk has been appointed Western sales manager for the Rainier Motor Co., of Saginaw, Mich. Mr. Kirk is well known in the industry as a former automobile manufacturer. He was part owner of the Kirk Bicycle Co. which produced the Yale car, and later became sales manager for the E. R. Thomas Detroit Co., and then factory manager for the Rainier Motor Co. Recently he has been Western manager of the Herreshoff Motor Co., of Detroit, which position he relinquished to resume his connection with the Rainier Co.

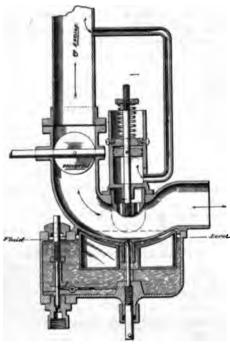
According to official figures there are at present 3,311 automobiles and 1,770 motorcycles owned in Vienna, Austria.

#### MOTOR VEHICLE PATENTS

#### Review of Specifications.

Carburetor.—Alexander Win-028 82R ton, of Cleveland, Ohio. July 20, 1909.

This invention relates to that type of carburetor in which the slowly moving volumes of air are subjected to surface car-



No. 928,828.

burization, and the rapidly moving volumes of air to spray carburization. This is also known as the puddle type of carburetor. The present patent relates to detail improvements on a carburetor which is the subject of another application for a patent filed jointly by Mr. Winton and Harold B. Anderson. It relates particularly to a method for keeping the richness of the charge formed constant independent of the position of the throttle valve. Referring to the figure, it will be seen that the carburetor comprises a downwardly curved, substantially horizontal pipe section. the lowest point of this pipe section there is a small opening through which it communicates with the float chamber of the carburetor, and the float is so adjusted that there is a slight amount of gasoline standing at the bottom of this pipe section, forming a puddle. The air passing through this pipe section will be charged more or less with gasoline vapor, according to its velocity, and in order to obviate this variation a sort of gate valve is provided which obstructs the passage through the pipe section directly over the spray opening more or less. The stem of this gate valve has secured to it a piston adapted to move up and down in a small cylinder, the lower end of which communicates through a tube

with the inlet pipe to the engine, above the throttle. That portion of the stem of the gate valve passing beyond the cylinder is surrounded by a coiled spring which bears against an adjustable nut.

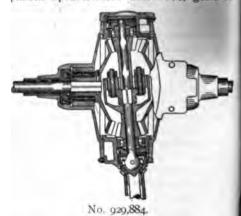
When the throttle is fully open the vacuum in the inlet pipe is very slight, and the spring surrounding the stem of the gate valve then draws the valve to its highest position. If, however, the throttle is partly closed, the vacuum in the inlet pipe above the throttle will be stronger. This vacuum will be communicated to the small cylinder above referred to, and the suction on the piston thus resulting will draw the valve down and restrict the opening through the pipe section directly above the spray nozzle. The velocity of the air past the spray nozzle is then less, but as the air comes into more intimate contact with the gasoline it is charged with gasoline vapor in substantially the same proportion. 929,884. Differential Gearing and Re-

versing Mechanism Therefor.—David E.

Ross, of Lafayette, Ind. August 3, 1909.

Filed April 13, 1906.

According to this construction the differential gear is placed on an extension of the propeller shaft, and the power is transmitted through bevel gears only after having been transmitted through the differential. Referring to accompanying illustration, the propeller shaft at its rear end connects through a universal joint, with an extension on which is carried a disc carrying two planetary sinions. These pinions mesh with a central pinion and an outside internal gear respectively, the two connecting through hollow shafts with two bevel pinions. Each of these bevel pinions meshes with a bevel gear connected to one of the rear axle drive shafts. The central shaft of the differential gear is not at right angles to the rear axle shafts, but is slightly inclined, so that the two concentric bevel pinions upon it mesh with bevel gears of



opposite sides. The central shaft of the differential gear is securely held in postion by eccentric bushings in the casing By revolving these eccentric bushings through a half revolution, each of the bevel pinions may be brought into mesh with the other bevel gear from that with which it meshed first, whereby the motion of the car is reversed.

# The Horseless Age

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#### Autogenous Welding as Applied to Automobile Parts.

BY HENRY CAVE.

At this season of the year when many automobilists can look back upon disappointments, due to sudden breakages of important parts of their cars, which have prevented their arrangements being carried out, or are contemplating having cracks of more or less importance permanently repaired during the approaching winter months, it is advisable for them to investigate the possibilities of autogenous welding by means of the oxyacetylene flame as a means of quickly repairing these breaks and thus doing away with the long delays attending obtaining replacements, and also considerably reducing the cost of carrying out this work.

It is also possible that the machine is an imported one, and spare parts are not to be had in this country. In that case the saving is, of course, much greater; or the car may be of such an early make that parts cannot be obtained any longer, or the damage may be so extensive as to



Fig. 1.

make it inadvisable to have new parts made. It may also be required to make a change of design, such as remodeling a touring car into a truck or lengthening the wheel base, in which event sections can be welded into the frame to produce the desired change.

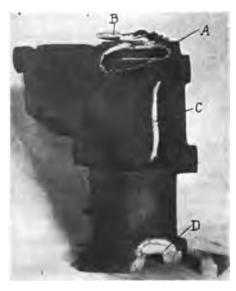
The use of the oxy-acetylene torch is well shown in Fig. 1, in which a break in a pressed steel automobile frame is shown welded, the work being carried out without even removing the body. The extent to which the paint was scorched can readily be seen. Metal is built over the break on the outside to insure ample strength, and is not noticeable when painted. If necessary, however, this reinforcement can be added on the inside. The outside is then filed off,

and there is then no sign of the frame having been broken.

The use of this process must not be considered in connection with automobiling alone, as it is equally applicable to repairs of all metals. Nor must its use be considered only as a means of repair, as there is a very large field of usefulness in connection with manufacturing, not only as a means of correcting errors in workmanship and defects of materials but also in uniting parts that have heretofore been riveted or bolted.

The process also opens up tremendous possibilities in connection with pressed steel, as parts can be pressed separately and welded together that would otherwise have to be made from castings. The extent to which this can be carried out is shown in Fig. 2. The parts of this exhaust manifold are made from steel tubing, the branches and flanges being all welded on, as well as the boss on the side. The end of the main tube is also closed by a disc of sheet metal welded in place.

The cylinder shown in Fig. 3 well illustrates the three main breakages to which these castings are subject. one illustrated, however, has been prepared as a sample. At A a break is represented that would result from the head of the valve breaking off and being forced against the crown of the cylinder and cracking it. The pieces B were cut out of the water jacket so as to weld the break from the outside. These pieces are then replaced and welded in. C represents a crack in the water jacket such as results from freezing, and D shows the tearing away of one corner of the bottom flange. This is welded entirely from the outside. metal being added to fill the corner so as to insure ample strength. The weld is not carried completely through to the bore, as that would necessitate remachining, which is not necessary otherwise. The line of the break which is left does



F1G. 3.

no harm and simply helps to spread the oil. It is, of course, possible to entirely obliterate all signs of the break if desired, but this is seldom done.

The fact that some of the broken parts are missing would not prevent this method of repair from being carried out successfully, as metal can be built in, or if of too extensive a nature for this a new part would be cast and welded in. In the same way a change of design could be obtained by removing a section and welding a new piece in of the desired shape.

The extent to which these changes in design can be carried out is well illustrated by the aluminum crank case shown in Fig. 4, it being desired to convert a four cylinder automobile engine of a well known type into a six cylinder. A damaged crank case was obtained and the two cases were then divided up so as to give the desired results, and were then welded together as shown. The repairs that had to be carried out can also be seen.

If it had been necessary to make an entirely new easting the cost of the job



FIG. 2.



Fig. 4.

would have been prohibitive, as the pattern would have been a very expensive item, and the case would have required machining by hand, as it would not fit into the jig ordinarily used. The original crank case utilized would also have been of little value.

This work, as well as that represented in the other illustrations, was carried out by the Autogenous Welding and Equipment Company, Springfield, Mass.

A good idea of the extent to which aluminum cases can be repaired is given by Figs. 5 and 6. Even more extensive damage than this could be satisfactorily repaired.

Fig. 7 illustrates a case in which a considerable saving was effected by the use of the autogenous welding process. The only defect was the splitting of the threaded steering knuckle pinhole by a too tight screw. This was welded up from the outside without injuring the

thread, and sufficient metal was built over to insure ample strength. The charge for this work was a very small percentage of the cost of a new axle, and there was no other possible way of satisfactorily repairing it.

A careful consideration of the above representative repairs by means of the oxy-acetylene torch will enable the reader to judge whether it be possible to repair breakages of any particular part of an automobile by this means, and to decide whether a new part is necessary or not

#### Book Reviews.

Automobile Troubles and How to Remedy Them. By Charles P. Root. Published by the Charles C. Thompson Company (not inc.), 338-344 Wabash avenue, Chicago. Price, \$1.50.

In this book the various troubles that occur with automobiles are taken up in alpha-

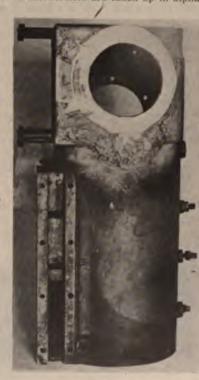


Fig. 5.

Fig. 6.

betical order, their symptoms are enumerated, and the remedies described. In the first part of the book there are two tables, headed, respectively, "Symptoms" and "Causes and Failures—Their Symptoms and Causes." The different troubles that occur on gasoline cars are then taken up and discussed in detail. The book is well written and should prove helpful to those who have to locate and remedy automobile troubles. It is illustrated, but only very sparingly. The volume contains 220 pages and is bound with flexible leather covers.

Luftfahrzengbau. Konstruktion von Luftschiffen und Flugmaschinen (Air Vehicle Construction. Design of Airships and Flying Machines). By Dr. Fritz Huth. Published by M. Kragn, Berlin, W., Germany. Price, 7.50 marks in paper covers, 8,70 marks in boards.

This book undoubtedly comes at an opportune time, covering a subject in which widespread interest is just being awakened



Fig. 7.

by the almost daily reports of new achievements in aerial navigation and flying. Dr. Huth's work is of a scientific and technical character, as distinguished from popular works. Only little space is given to the history of the subject, and the greater part of the work is devoted to minute descriptions of the leading types of airships and flying machines, and to a discussion of the underlying principles. In fact, as the title would lead one to expect, the book is written for the benefit of the experimenter and builder and not so much for those who take a sportsman's interest in aerial locomotion The book is profusely illustrated, both with half tones and line cuts, and it incorporates a considerable number of plates, for the most part of airship and flying machine motors

At a meeting of leaders in the German motor movement, including Prince Henry, at Berlin, on October 4, it was decided to hold the contest for the Prince Henry Cup again next year within the boundaries of the German Empire, June 1 to 8. The handicap of professional drivers will be abandoned. Two speed tests will occur in the itinerary—the first between Genthin and Burg, and the second on the old Kaiser Cup course between Limburg and Weilburg in the Taunus.

#### Design of a Motor Propelled Ambulance.

BY JOSEPH LEDWINKA.

Plate I is a suggestion in motor ambulance design. This design of body is applicable to any chassis with gasoline or electric propulsion. The tread of the wheels, or better, the over-all dimensions over the tires, should be preferably made to fit the street car tracks of the particular town in which the vehicle is to be operated. In that case the use of the smooth rails, especially in badly paved streets, will give more comfort to the patient and will also make higher speed possible.

The body construction with stretcher arrangement, as shown in the design, is largely used in European cities. It has been proven that this is the most convenient and most cautious way of conveying a patient into the interior of the vehicle body. The interior is wide enough to allow two or three attendants or physicians to work there in cases where the injured person needs immediate treatment. The most necessary appliances are provided, and are easy of access.

The body is built like delivery wagon bodies. The right hand side of the body proper is hinged along the lower edge above the wheel panel and drops to a horizontal position over the rear wheel and mud guard, exposing the whole length of the specially constructed stretcher. This stretcher is provided with rubber tired wheels which run in grooved rails built into the inside of the hinged side door. The rails, which continue to the interior, are hinged to the one on the door and permit of the free opening and closing of the door. They form a continuous groove for the wheels to run in. The inner ends of the grooved rails are curved upwardly, acting as a stop for the wheels, and are supported on pivotal legs to maintain a horizontal position. On the opposite side in the interior are three or four singly hinged seats which fold upward out of the way.

Above the large side door are window sashes provided with frosted glass panes, and made to open inwardly about three inches, with the hinges on the bottom. The front partition, separating the interior from the driver's seat, has a small drop window, about 12x18 inches. The door at the left rear end of the body is hinged to the left corner post and has a drop window

down to the surface. The whole interior, except the sheet iron lined roof, should be covered with 3-32 inch thick plain rubber sheeting which must be cemented to the wood. The sheet iron ceiling should be painted to resemble the color of the rubber on the sides.

In this way a very neat as well as sanitary interior is obtained which can be cleaned and disinfected by means of a hose. All the chests holding medicines and instruments are removable. On the roof

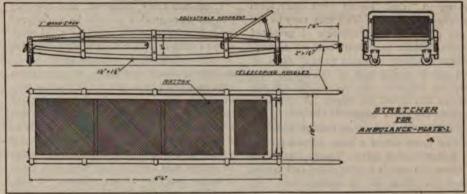


FIG. 2.

and roller curtains. The other window at the rear end is of frosted glass, as are the narrow ventilators underneath the roof at the rear end.

In building an ambulance the aim should be to avoid all sharp corners and crevices in the interior which would permit of the accumulation of dust and germs. This requirement is generally overlooked, which makes the disinfection and cleaning a hard or impossible task.

The inside of the roof should have a sheet iron lining, binding the bows; the sheet iron should come down all around 1½ inches in a curve of one inch radius, forming a round corner. The four sides should all be paneled to form a smooth even surface; all corners should be provided with concave moldings, smoothed

are three galvanized tanks containing cold water, coal oil and hot water respectively. The coal oil is led through pipes to a burner underneath the hood of the driver's seat for heating the water in the tank on the roof. The hot and cold water are led into the interior for the use of the attendants. A small basin to receive the water is hinged to the front partition and empties itself when turned up. Electric lights overhead and extension cords with hand lamps fed from a small storage battery furnish illumination.

The stretcher, with the main dimensions shown in separate cut, is made entirely of white ash or hickory. The sides are bent without special preparation of the wood. The curves are slight and can be bent easily.

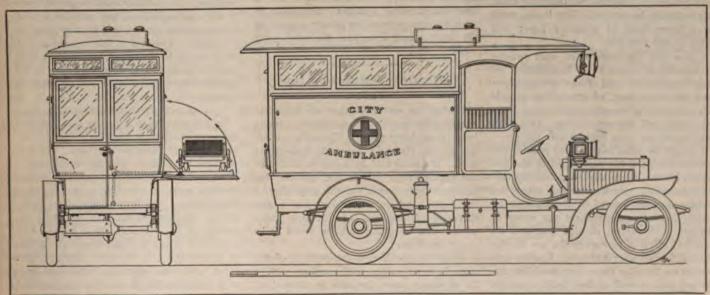


Fig. I.



## Home Made Fire Extinguishers for the Car.

I note J. M. Prudden's article, "A Home Made Automobile Fire Extinguisher," in The Horseless Age of September 22. Another way to make a dry powder extinguisher is to saw in two a small tin can having an "Ideal" top or some other form of "pry open" cover. This may vary in size from a can such as samples of prepared foods come in to a syrup can of a much greater diameter. Take a piece of sheet tin and roll it into a tube of the proper size. Use the halves of the can as the top and bottom and solder the edges. A ring fastened to the cover completes the job.

I believe that in every roll of Ruberoid roofing there comes a long, tubular tin can of Ruberine roof paint. Except that it has a screw top and is a little short this is just about the thing for an extinguisher. By fitting the top with some sort of a ring or key handle to make unscrewing quick and easy, and giving it a coat of paint for looks. it should make a pretty good auto extinguisher.

On an automobile weight is usually to be considered, which might make an extinguisher made out of lead pipe rather objectionable. A very light, inexpensive and easy way to make an extinguisher is to take a large pasteboard mailing tube, such as is used to hold pictures, drawings, etc., and fit a wooden plug tightly into one end. Secure it there by putting tacks through the sides of the tube. Stop the other end with some kind of a cork or plug. Put a large screw eye through the cork to hang it up by.

Put a metal washer on the inside of the cork and bend the end of the serew over at right angles to prevent its pulling out. By dipping the cork in melted paraffin the necessary amount of friction and tightness of fit can probably be secured. For looks, paste on a large sheet of wrapping paper and paint to suit yourself.

I note that the contents of most powder extinguishers consists of bicarbonate of soda (saleratus) and from one-half per cent. to 10 per cent. of starch, red or yellow ochre, fuller's earth or some other powder which will prevent caking. This does not deteriorate from contact with the air.

It might be remarked that dry powder fire extinguishers are not recognized by the fire underwriters. Generally these extinguishers generate a smothering gas when the powder becomes heated by the flames. In liquid chemical extinguishers the water is charged with carbon dioxide gas, and its principal office is to convey the gas to the fire and thus smother it at once. The fire underwriters consider these very good, but the item of cost, as well as their bulk, seems to prevent their use on automobiles. Yet a

quart extinguisher of this type can be bought for about 25 cents! For what else is a siphon bottle of aerated water, such as vichy? To be sure, it is made of glass, but the walls of the bottles are quite heavy and much more delicate articles are often carried on automobiles. One defect, however, might be the temptation to have a drink on hot days and thus run the risk of having the bottle empty when a fire occurs.

I should think, also, that a tire tank carrying carbonic acid gas would be useful as a fire extinguisher.

I do not think, however, that the dry powder extinguisher should be considered entirely without merit. At least, bicarbonate of soda is lighter than sand. The value of this extinguisher was demonstrated to me but a short time ago. A glass kerosene lamp had been left burning on a window seat. The window was open, but the shade was pulled down. A stiff breeze was blowing, which pushed against the shade so strongly that the lamp was tipped over and thrown down under a low tub whose rounded bottom was supported by four legs, about 6 inches long, set at the corners. It happened to land just inside one of the short legs. The kerosene caught fire. To have thrown water over it would have been to spread the flames all over the floor, and the tub leg and lack of space between the tub bottom and the floor prevented the use of several small rugs which happened to be handy. Finally, a powder extinguisher was brought, and a few flirts of that put the fire out completely. I should think a fire of this nature might easily happen around an automobile or in a garage. On investigating it was found that the porous powder had absorbed the oil, forming a kind of mud. Over this was a layer of dry powder which had shut off all air, thus stopping combustion. Such a fire might have been put out with a siphon bottle, but it would have been much harder to clean up. As it was, it was merely necessary to sweep up the broken glass and powder, and throw it into an ash can. It would seem a pity to have discharged a 3 gallon extinguisher on such an unimportant fire where a quart of the liquid would have done the work.-Jay Teel.

## Vulcanizing Patches on Inner Tubes.

During the warm weather we have had considerable trouble from patches coming loose from inner tubes. Naturally we began to cast about for a way to make them stick. We were told by a representative of the manufacturer whose tire we use that acid cure only "cures" at the very edge of the patch, and so we looked for a still more secure method of patching inner tubes. The following solution seems to be a very good one:

Clean the patch and the portion of the tube it is to cover and roughen with a file of emery paper, the same as when about to apply an ordinary patch. Coat the above

mentioned surfaces with a cement made by dissolving raw rubber in gasoline, and when it is sufficiently dried apply the patch. Have a clamp made by drilling two holes through the ends of two small metal plates similar to an "inner tube repair clamp." One of the plates must be thick enough so that a hole may be drilled in it to hold a thermometer. Clamp the portion of the tube having the patch firmly between the two plates and protect the adjacent parts of the tube with cardboard, or, if necessary, with asbestos paper. All parts of the tube except the patch itself should be kept out of contact with the metal. Of course the patch and all the rubber which comes into contact with the paper should be thoroughly dusted with talc powder before applying the clamp. Suspend the clamp in the air or prop against some bricks and heat to 135° C. for twentyfive minutes. The thermometer to be used is similar to a medical thermometer, but registering up to at least 200° C. The heat may be applied by means of alcohol or gasoline blow torches, a Bunsen burner, alcohol or kerosene lamps. I have found the alcohol blow torch to be the most convenient for my use. Play the torch against the plate touching the patch, which should also hold the thermometer. Reduce the flame gradually as the temperature rises. To use a lamp or Bunsen burner the clamp must be suspended almost horizontally, taking precautions, of course, that the thermometer does not fall out. If lamps are to be used bring the temperature up with an alcohol lamp and hold it there with a kerosene lamp.—Jay Teel.

#### Some Repair Shop Notes.

SMALL SENSITIVE DRILL.

A novel drill for drilling small holes, as for cotter pins, etc., is in use at one of the repair shops in New York city. It is made very light so as to avoid frequent breaking of the drills. The power is furnished by a small compressed air turbine which will run up to 12,000 r. p. m. on 100 pounds air pressure. The turbine shaft is geared down to the drill spindle in the ratio of 4 to 1. Lower speeds are obtained by throttling the air supply. The drill is said to have proven most satisfactory in operation, and to have saved a great deal of expense, owing to the fact that ordinary drills are broken very frequently.

AIR-OPERATED GREASE GUN.

In the same shop a grease gun operated by compressed air is used for filling the differential gear cases with grease. The gun consists of a brass cylinder containing a plunger below which the grease is compressed, with air connections at the top of the cylinder. The lower head of the cylinder is clamped on and can be easily removed; it has connected to it a hose with a suitable nozzle through which the grease is forced out. It is stated that the gun saves much time when the differential cases of a large number of cars have to be filled, and is a convenience at all times.

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#### The Plight of the Carriage Industry.

If there was still a vestige of doubt left in the mind of anyone regarding the condition of stagnation in the carriage industry. and particularly that branch of it which specializes in stylish and luxurious rigs for the wealthy, it was dispelled by the admissions of President Connolly, of the Carriage Builders' National Association, at their annual meeting in Washington, D. C., last week. The automobile, Mr. Connolly asserts, is monopolizing the attention of those who can afford to buy the good things in the carriage makers' line, and he claims to have observed, moreover, that people have become more liberal with their money since the automobile arrived on the scene. He states that those who a few years ago would make a sacrifice to save \$100 or \$200 in a carriage will now pay \$6,000 for an automobile, although most of them are not now in as good circumstances as they were then.

Mr. Connolly believes that the salvation of the coach builders lies in entering the automobile industry themselves. That many other carriage builders are of the same opinion has been evident for some time, but whether this step will really prove their salvation remains to be seen. The carriage builders certainly made a big mistake when they allowed the manufacture of automobile bodies to slip out of their hands. All the early bodies for automobiles were built in carriage shops, and the work on the bodies today is done by the same class of men-body makers, carriage blacksmiths, carriage painters, etc.-as are employed in carriage shops, only they are employed in the body department of automobile factories or in special automobile body establishments. The construction of automobile bodies would have naturally fallen within the province of the carriage builder, and few automobile manufacturers would have thought of establishing their own body departments if they could have secured bodies of suitable design and been assured of satisfactory work and prompt deliveries. But it seems that most of the carriage builders looked with disdain on the automobile, regarding it as a passing fad, and considered themselves superior to taking instructions from the auto makers regarding points in construction which were not in accordance with their own experience.

In a carriage the body is generally the most important part, from the standpoint of cost of manufacture, but in the automobile the chassis is considerably more important. The average carriage builder does not make his wheels, axles, springs, etc. He buys these parts and assembles them, and then applies a body of his own manufacture and sells the complete vehicle. It is now possible to proceed in the same way in the manufacture of automobiles. That is, all the component parts of a chassis can be bought in the market and the carriage builder can assemble them, fit his body and market the car. Unfortunately for him the selection of the parts and the assembling thereof are tasks for which he is not equipped by experience, and upon the selection of well made parts, all properly proportioned for the weight and power of the car, and upon their careful and workmanlike assembling depends the success of the machine,

The carriage builder naturally desires to become an automobile manufacturer, to enable him to maintain his relations with his agents; but in our opinion his proper place in the auto industry is that of a parts maker, furnishing bodies to the automobile manufacturers, as the assembling of automobile machinery is rather too much out of his line. To take up the assembling of the chassis he must install special equipment and engage a special staff, experienced in this line of work. It would undoubtedly be much easier for him to secure a goodly share of the auto body business than to enter into successful competition with experienced automobile assemblers.

#### A Possible Readjustment of Auto Prices.

It would not be surprising if there should be a slight general increase in automobile prices during the coming winter. There have been various indications of late of such a tendency, and the conditions are certainly ripe for such a move on the part of the makers.

In the first place, it should be remembered that during the depression in the industry following the financial panic automobile prices tumbled, and in their endeavor to secure as large a share of the available market as possible some of the manufacturers went rather close to the dividing line between profit and loss. Whether it was this lowering of prices or the recovery of the public from the effects of the panic that did it, at any rate the demand for cars grew enormously during the past year. With the increase in the rate of production to meet the increased demand there came, however, a scarcity of raw material and of skilled labor, and increasing competition for the available supply of both led to an increase of their prices.

The most important instance of an increase in the price of raw material used in automobile manufacture is furnished by crude rubber. This commodity now sells at twice the price at which it could be bought two years ago. The auto manufacturer, of course, does not buy crude rubber, but rubber tires, and the price lists for these have been "upwardly revised" twice within a few months. The tendency in other materials purchased by the auto makers is also upwardly, notably in leather and curled hair for upholstering. Steel prices are also rising, owing, it is said, to increasing activity in all lines of industry, and though the total cost of the steel in a car is a small item when compared with the selling price, yet an increase in this item of 10 or 15 per cent. counts if the margin of profit is already quite narrow.

The cost of skilled labor is also rising, especially in the Middle West, where there has been an unprecedented demand for machinists and other metal workers experienced in automobile work of late. We know of several instances where large automobile manufacturers in that part of the country sent representatives to the various large cities to search the labor markets there for skilled mechanics

There has also been some talk of an inclination among parts makers to raise their prices, and combinations in particular lines of manufacture have even been hinted at, though these rumors are probably without foundation. If the parts makers actually should insist on higher prices it would not be at all surprising in view of the above remarks regarding conditions in the labor and raw material markets, which affect the parts manufacturer as well as the car manufacturer.

So far three of the most prominent models of the past season have been increased in price. Although a more complete equipment in each case accounts for part of the increase, we believe that the manufacturers in raising their prices were mainly actuated by the increasing cost of production.

#### Trend in Front Axle Design.

For years past the I beam type of front axle has been rapidly supplanting other types. At the present time the manufacturers still adhering to tubular axles are very few, although one or two of them are of distinguished reputation.

The delay which has been noted in making this change has probably been due more to commercial reasons than to a failure upon the part of automobile engineers to recognize the desirability of the step. Most mechanically trained men of the industry have long ago recognized the superior fitness of the solid I beam section forging for this purpose, and also the importance of doing away with pinning and brazing in such a vitally important motor car element as the axle. It is only rather recently, however, that the metallurgical industry has been in condition properly to supply the demands made upon it in this direction. Considerable time was demanded for the development of facilities adequate to the production of axle forgings in the variety required to meet the varied demands of the industry in quantities and at satisfactory prices. The metallurgical industry and the parts makers are largely responsible for the creation of the facilities that are leading to the nearly universal use of I beam axles.

The development of means for producing an axle and steering yokes as a single forging without welds, the determination of the steels best adapted to the purpose and the most appropriate methods of heat treatment are among the lines along which progress has been made, under the insistent demand of the automobile engineer.

It is to be noted that a number of makers who have been using tubular front axles are announcing single piece, alloy steel axles of the I beam type, with integral steering forks and spring seats, as features of their 1910 product, and it is also worthy of remark that, almost without exception, the new models of low priced cars, which would a few years ago have been fitted with tubular axles, are now equipped with the I beam tvpe.

Of the I beam axle cast in special bronze, which was somewhat used a year or two ago, much less is now heard, but the pressed steel axle of channel section is assuming a somewhat greater prominence, in keeping with the general increase of popularity which pressed steel is now enjoying as an automobile material.

It may confidently be asserted that the present movement in front axle practice is in the direction of increased safety for the user and a lightening of car weight in proportion to strength. In cases of production upon the large scale it may also be in the line of economy in production.

#### Selling Commercial Cars in the Dead Season.

Every dealer will have observed that the interest of likely purchasers of pleasure vehicles rises and falls with the seasons. The first signs of spring awaken in every lover of nature and outdoor life the desire to own a vehicle enabling him to spend most of his leisure on the road, and persons who have ordered cars then often literally besiege the agencies, urging them to hurry delivery of their cars as much as possible, while those who have been deferring the placing of their order are induced by "the spring breezes" to take the step. All through the summer there are prospects for the immediate use of cars purchased, if they are delivered within a reasonable period, and this prospect necessarily helps along sales. Late in the fall, however, and during the early winter, people do not feel the need of touring cars so much, and sales of such vehicles naturally drop off considerably. The dealer in the larger cities then has the closed town car to fall back upon, and the prevalence of landaulets, broughams and limousines in

the traffic of our big cities shows that it offers quite an extensive field. But in the smaller cities and country towns it will probably always be impossible to place many of this class of cars, and the dealers in these localities have to look for other types for rounding out the selling season.

The one class of vehicle that can be sold equally well at any time of the year is the commercial vehicle—the truck or delivery wagon. In some respects it should be easier to sell a commercial vehicle in midwinter, because, as has been shown by experience, the motor vehicle is far more independent of extreme weather conditions than the horse. In New York city there have been many instances in recent years when during sleet storms or rapid thaws the streets were rendered so slippery that all horse traffic was practically at a standstill, while motor delivery wagons equipped with non-skids were spinning along with their usual celerity.

The dealer who suffers from lack of interest in touring vehicles at this time of the year will therefore be well advised to look into the prospects for commercial vehicles in his neighborhood, and if they are encouraging to take on a line of motor delivery wagons. A few good vehicles of this type placed now will, if they prove satisfactory to their buyers, tend to help along sales in that district later when the dealer may have even more important reasons for taking up commercial vehicles.

#### Coming Events.

October 18-30-Dallas, Tex., Show at State Fair.

October 22-29-San Antonio, Cal., Reliability Contest. San Antonio Light and Gazette.

October 24-28-Houston, Tex., Five Hundred Mile Endurance Run for Houston Post Trophy. October 25 to November 3-National Tour, from

New York to Atlanta, Ga. October 27-29—Vicksburg, Miss., Race Meet, Vicksburg A. C.

October 28-30-Dallas, Tex., Race Meet, State Fair.

October 30-Vanderbilt Cup Race, Long Island

Motor Parkway, Long Island, N. Y.
October 30-31—Los Angeles, Cal., Inaugural
Meet at Ascot Park, Los Angeles Motor Racing Association.

November 1-Indianapolis, Ind., Race Meet, Indianapolis Motor Speedway Co.

November 3-13-Salt Lake City, Utah, Outdoor Show.

November 4-Tampa, Fla., Reliability Contest.

Tampa A. C. November 6-Start of Los Angeles (Cal.) Phœnix (Ariz.) Road Race, Maricopa A. C.

November 6-13-National Automobile Show, un der the auspices of the N. A. A. M., at Atlanta

November 6-17-San Antonio, Tex., Race Meet, San Antonio A. C.

November 8-9-Savannah, Ga., Highway Relisbility Contest, Savannah A. C.

November 9-13-Atlants, Ga., Track Races, Atlanta Automobile Association.

#### Material Specifications.

BY E. J. BARTLETT.

Purchasing agents or buyers of automobile supplies must be rather modest and retiring in disposition since one sees so little of their problems expressed in the columns of the trade papers. Yet the position is an important one and it would seem as though a more extensive interchange of ideas and methods pertaining to the purchasing of materials would be helpful, not only to the buyers but to their associates as well.

Possibly the closest associate to the buyer should be the engineer, since he, either directly or indirectly, specifies and is responsible for the constructional material purchased. Whatever the local factory conditions may be, there must necessarily be specifications more or less complete of the supplies required, and in a general way there are at least three sources from which these specifications come. These in the order of the importance of the material are the Engineering, Factory and Business Departments. In different factories departmental lines are drawn differently, but the results are substantially the same.

While specifications from the two latter departments are important, as they cover all supplies necessary for conducting the business, their volume and character for the most part do not make them as important as those issued by the former department, which covers the materials entering into the construction of the product. It is, therefore, highly important that the engineer work in close touch with the buyer and have as complete knowledge of the material market as possible, and not interfere with the direct duties of his position.

There are many simple ways in which the engineer can assist the buyer and save money for his company by using good sense and care in the material specified and the form in which it can best be used. In a way some of this work seems outside the province of the engineer, but since the buyer can hardly be expected to know as thoroughly the material and conditions under which it is used as the engineer, the latter is the proper person to decide many points which at first might seem more properly to belong elsewhere. Some simple precautions which may well be used in specifying material follow.

#### PATTERNS.

In small factories, in particular, much or all of the pattern work is placed outside, and one of the annoying difficulties of manufacture is to get correct castings from patterns made by the ordinary job pattern maker. The responsibility is divided. The pattern maker lays the blame on the molder, and the foundry boss says the pattern should have been made some other way. Between the two the factory stands for the delay and incidental expense and

finally pays the foundry for fixing up the pattern to suit its own ideas. In the long run it is usually cheaper and more satisfactory to put the pattern making up to the foundry and order castings which will machine to the print submitted. Most foundries of any size have a pattern department, and those which do not usually have some connection with a job pattern shop where they have their work done. In this way the foundry objections and excuses, so far as the patterns are concerned, are eliminated.

Even with such an arrangement the matter of stock for finish is often a disputed point. Some factories prefer more stock for finish than others, and again the shape of the finished surface and manner of handling the piece in machining has something to do with the amount of stock required. Some factories make separate drawings for patterns, which add to the expense and complication of the drawings. Others indicate by dotted lines on the shop drawings the amount of finish required, but this method often complicates the drawing, and no drawing can be too clear for the ordinary machinist.

The writer has found it good practice, for outside pattern making, to use the dotted line system as last mentioned, but mark duplicate prints only, one print being sent to the pattern maker and the other put on file. With well made drawings thus carefully marked up there is not much excuse for the foundry producing other than reasonably correct castings.

Where a considerable quantity of castings are to be made from a new pattern it is always a good plan to have a sample casting submitted to be laid out carefully by the factory inspector. This casting will be found handy in designing the tools and fixtures and can be tried in them when completed. With malleable iron too much time may be consumed in waiting for an annealed casting, and a hard iron sample will often answer the purpose. It should be noted, however, that a hard iron casting expands a little during the annealing process and allowance should be made accordingly.

Of course, the kind of pattern required should be specified, whether soft wood, hard wood, or metal, as well as the number on a gate, if gated. With some pieces very similar, but right and left hand, it is possible to have a part made loose and fitted in different positions on the same main pattern. This is particularly true of master patterns from which metal patterns are made.

#### DROP DIES.

The same precautions in regard to finish allowance apply to drop dies as to patterns, and lead casts should be used for testing the correctness of the sizes and for tool and fixture making. Where break-down dies are required it is sometimes well to specify whether cast iron or steel is re-

quired, depending on the probable amount of service required. Such precautions may save delay when the parts are badly needed.

BAR STOCK.

Since it is impossible to tell a year in advance the exact sizes and quantity of a grade of steel, it is customary to insure prices and deliveries by contracts for a certain length of time, usually a year, for a specified tonnage at a specified base price. This base price should be clearly noted in the contract as covering all diameters of bar stock of this grade within certain limits. All additions to the base price should also be given; these additions covering the extra price charged for delivering bars of such lengths as are multiples of any specified figure, annealing, heat treating, and sizes different than those covered by the base price.

With the conditions of the steel contracts in mind it is sometimes possible to specify the bar steel required more intelligently than would otherwise be possible. For instance, shafts of fairly good length for automobile work, such as the axle driving shafts, are usually purchased by specifying bars of steel of correct multiple length. To illustrate, we will suppose these shafts to be 321/2 inches long, 11/4 inches in diameter and made of 31/2 per cent. nickel steel. The base price of such steel for this diameter is about 6 cents per pound, and the addition for bars of multiple length is I cent per pound. This stock weighs 0.35 pound per inch, and with bars of random length the wastage may evidently vary from nothing to, say, 32 inches, or an average of 16 inches per bar. Random bars usually come of such length that at least five shafts may be cut from each. In the case of bars of multiple length we may then say the cost per shaft, less allowance for cutting, which will be the same in either case, will be 321/2 × 0.35 ×0.27=0.80. In the case of bars of random length the cost per shaft will be

 $(32\frac{1}{2} \times 5 + 16) \text{ o.} 35 \times \text{ o.} 06 = 0.75.$ 

This comparison shows it is actually cheaper, aside from the possible value of the short ends, to specify random lengths when an additional price is asked for selecting bars of multiple length. It is possible to obtain bars at least a certain length and let the variation beyond this come what it will, which seems the cheaper when the multiple length bars are more per pound. At the same price some little saving is effected.

In much the same manner comparisons may be worked out showing whether it is advantageous to buy such stock annealed, heat treated or cut to length, the answer depending largely on the factory equipment for this work.

The chemical analysis required is another important specification for steels used for severe service. It is clearly impracticable to obtain an exact analysis, and if such is specified the chances are that less care will be taken to get as close as possible than if reasonable limits were given. Usually a ten point limit may be given for the carbon

1

and manganese elements and an upper limit for the sulphur and phosphorus.

A very good and easy analysis for carbon automobile shafting may be specified as follows: 0.40 to 0.50 carbon, aim at 0.45; 0.60 to 0.70 manganese, aim at .65; 0.05 or below sulphur; 0.05 or below phosphorus.

Another point to be considered is whether black, cold rolled or semi-smooth stock is required, all different in price. Sometimes at little, if any, increase in cost cold rolled bars a few thousandths under size may be purchased, to use inside a steel tube, for instance, and save a machining operation. A good way to make such specifications is to order it of such a size that a ring of the required diameter will telescope it. The reverse applies to ordering steel tubing for such parts as spacers. It may be specified to telescope a plug of the required size.

#### MISCELLANEOUS.

In specifying tubing or sheet stock the decimal equivalent should be given as well as the gauge, thus: No. 16 B. W. Q. (0.065 inch). This will avoid all possibility of confusion in the different gauges.

Iron pipe should be specified in regard to thickness as standard, extra heavy, or double extra heavy.

Grease and oil cups should have the thread mentioned as well as the size and make, as there are often different threads furnished. Also specify the finish required after the relative prices are learned. The rough brass finish, for instance, is considerably cheaper than the polished brass, and for many places just as good. Such specifications, for example, would be No. 00 Empress ratchet grease cup, one-eighth of

#### Testing a Car on a Hill Course.

By Albert L. Clough.

It is not at all easy to assure oneself absolutely whether a car is operating with its wonted power or not unless definite tests are undertaken to that end. The operator is quite likely to be deceived into a false conclusion if he relies upon cursory observations unsystematically made. In making systematic tests upon the condition of a car the same piece of road should always be used as the testing ground, in order that each test may be fairly compared with those which have preceded it. A street or road should be chosen which possesses as nearly as possible a uniform surface at all times, an asphalt or a well cared for macadamized street, bearing a light traffic, answering the purpose best. The street or road chosen should include a hill or grade steep enough to slow the car down to a reasonable speed, say 20 miles per hour, on the high gear, with the throttle wide open and the spark in its usual position with, say, two persons aboard. In the case of a very high powered car all tests may be made with the throttle not fully open but open to a certain notch of the segment, which may be marked or otherwise noted.

#### TESTING HILL CLIMBING ABILITY.

Upon receiving a new car, putting it into commission in the spring or after an over-



THE HORSELESS AGE

an inch pipe thread, rough brass; or No. 4D Winkley oiler, Ax32 V thread, nickel.

Spring lock washers are other common parts which are made in a variety of forms. To be sure of what is required the section and type as well as size should be given. Thus, 36x3x1/4 inch positive type would specify a washer for a 3/4 inch bolt which had a section 3/4 inch wide by 1/4 inch thick with an upturned chisel end.

Many other examples of a similar nature could be given, but the above will serve to indicate that more concise information in regard to the material supplies than is usually given is of practical value.

It is, of course, not possible for the engineer of a large factory to give very much of his personal attention to such detail, but it is possible for him to train his men to a knowledge of such seemingly small matters. If the constructional materials are requisitioned outside of his department from his drawings, full specifications on the drawings are especially important. In small factories such requisitions are frequently placed with the buyer direct from the engineering office. Even then the drawings should be complete to serve as a basis and record.

hauling, a test of its performance up this hill may be made, and at intervals thereafter other similar tests may be made, which, when compared with the preceding ones, will give a very fair idea as to changes in operative condition. The test run should be begun at a certain point A at a short distance below the grade, and at a certain other point B just at the foot of the grade the car throttle should have been so manipulated that the car speed is a certain number of miles per hour. At this point B the throttle should be opened wide in the case of a moderate powered car, or opened to the chosen notch of the quadrant in the case of a high powered machine, and from that point on the speedometer should be watched. At a certain later point on the hill C, which will be the steepest portion of the grade, the reading of the speedometer should be accurately noted, this reading being the one of most importance in the test. If a magneto is used the spark lever may well be left unchanged throughout the test at a point about as high as will secure proper operation of the engine at the lowest speed reached, and the particular notch used should be noted and used in all succeeding tests. If the battery system of ignition is used the spark may be lowered as the car slows down, note being made of the highest and lowest points used on the quadrant, and the point at which the change was made

The gasoline tank should be filled to about the same point on each test; the top and wind shield should either be up or down on all tests, and the passenger weight and the weight of supplies should always be the same. Before making the test the car should be driven so as to bring the cooling water to about the same temperature in each run.

#### RECORDS.

A record should be made including such data as the following: Course (giving street or road); date; weather (giving approximate temperature and wind); passengers (give weights); condition of circulating water; wind shield and top (whether up or down); condition of tanks (whether full or not); ignition (whether magneto or battery system); spark position (give notch number or numbers on quadrant and place of change of spark position, if any); speed at point A; speed at point B; throttle opening used from B to C; speed at point C; remarks (covering any changes made in car since last test and running qualities of the motor and car).

Two records of this kind of tests made at different dates, when the items of "speed at point C" are compared, will give a pretty good indication as to the maximum hill climbing capabilities of the car upon the two dates.

#### BRAKE TESTS.

A test may be made in a similar manner and on the same occasion, using second speed instead of third. This will act, in a way, as a check upon the high gear test as regards motor condition. At the same time that the hill climbing test is made the brakes may also be tested. The car may be driven up to point C on the course, and stopped and the emergency brake set just hard enough to prevent the car from moving backward. The number of the tooth upon the ratchet may be noted and entered upon the record. If there is any change in this particular between two tests the amount of emergency brake adjustment required will be known. The car may instead be driven down the hill and stopped at point C, the notch on the brake quadrant which has to be used to hold the car from forward motion being noted. The foot brake may also be tested as to its sufficiency to hold the car against either forward or backward motion at point C, although as this brake has no ratchet exact data are not obtainable.

#### ADJUSTING THE CARBURETOR.

A course of this kind, including a hill of this character, is very handy when one is trying to secure a carburetor adjustment best adapted to hill climbing, the speeds

noted at point C on different runs giving a very good indication of the merits of various settings of the needle valve and auxiliary air openings. It is also very useful in comparing the relative hill climbing capabilities of different cars. The writer uses a hill in his home town for the purpose of "sizing up" the hill climbing qualities of cars of various makes, and finds the results very interesting. The driver is always asked to attain a certain speed at point B and at that point to open the throttle wide. The speed at point C, as indicated by the speedometer, is noted, and may be compared with the corresponding speeds obtained from other cars upon the same course. Points A, B and C are, in this instance, streets intersecting the course.

#### COASTING TEST.

In addition to the periodical tests of hill climbing capability and brake efficiency recommended above it may be of interest to make a coasting test which will indicate whether there is any change in the frictional resistance of the car. To carry this out the car should be headed down the hill and when point C is reached so controlled that it is running at, say, 5 miles per hour by the speedometer. At this point the spark should be cut off and the car allowed to coast, with the engine acting as a brake. It will speed up somewhat in going down the grade, and will then slow down as the more level portion of the course is reached. The point at which the speed has dropped again, to, say, 5 miles per hour, should be noted and recorded for future comparison. A closed throttle should be used. Whether the high gear or intermediate gear should be used will depend upon the steepness of the hill and as to whether a safe speed will be exceeded with the high gear in use. It may be possible to make a test with each gear in use. The further the car coasts the less is the total frictional resistance, including that of the engine.

#### FREE ENGINE COASTING TEST.

If a coasting test exclusive of the engine is desired the car may be driven down the hill to some point as D, reasonably near the foot of the grade, and stopped. The brakes may then be released, the clutch disengaged and the gear neutralized, when the distance which the car coasts will serve as a fair criterion of the frictional losses due to the running gear and the part of the transmission system which is in use. Instead of neutralizing the gear any one of the gears may be left in mesh, so that the resistance due to gear and gear shaft bearing friction may also be included.

#### RECORDS OF COASTING TEST,

The record of a coasting test should include, in addition to the date, the course used, passengers carried, the weather and so forth, a definite identification of the starting point and of the stopping point; the speed at starting and stopping (entering o on the record if the car is at rest at either end of the test); whether clutch was en-

gaged or disengaged, and what gear, if any, was in mesh.

A coasting test may sometimes throw light upon the results of a hill climbing test, as any undue frictional resistance produces the same effect as does a lack of engine output upon the capability of a car to mount a hill at speed.

Records such as suggested above are very interesting if carefully made at proper intervals of time, and definitely inform the owner as to how his car is maintaining its powers. They are often the means of calling attention to defects in ignition, compression, carburation, lubrication and faulty adjustments of the brakes and other operative parts of the car.

#### A Permanent Magnetic Metal.

A patent on a permanent magnetic metal, assigned to Charles F. Splitdorf, was issued on October 12 to Samuel E. Gertler, of New York. The invention consists in the addition of a small proportion of aluminum to alloy steel of permanent magnetic qualicies. Either tungsten steel or manganese steel may be used, or a steel containing both tungsten and manganese. According to the inventor, a suitable alloy may be made by

melting together ingredients to give the following composition:

Tungsten, 5.25 per cent. Carbon, 0.65 per cent. Silicon, 0.15 per cent.

Manganese, 0.25 per cent. Chromium. 0.20 per cent.

Sulphur and phosphorus, 0.02 per cent. or less. Aluminum, 2.5 per cent.

Iron sufficient to make 100 per cent.

It is claimed that a steel produced in accordance with the invention possesses high permanent magnetic qualities, and is particularly useful for magnetos and other electric instruments.

#### Anniversary of the Discovery of Petroleum.

Leslie's Weekly calls attention to the fact that it was slightly over 50 years ago, on August 28, 1859, that Edwin T. Drake, after months of untiring toil, first "struck oil" near Titusville, Pa. Petroleum had been found in springs in several parts of Pennsylvania before 1859, but Drake was the first one to specially bore for oil. In 1859 only 84,000 gallons of crude oil was produced, while in 1908 the world's product amounted to 6,000,000,000 gallons, of which 60 per cent, was produced in the United States.

## Approximate Wood Wheel Diameters for Various Sizes and Types of Rims.

The following table, which should prove very convenient to engineers and repairmen, has been compiled by the Firestone Tire and Rubber Company, of Akron, Ohio:

Size Tire.	Clincher and Universal.	Firestone Demountable.	Fisk Bolted On,	Pisk Demountable.	Continental Demountable.	Continental Demountable, Metric Sizes.
30x31/4	2211/16	2111/16	2113/16	19%ie	22	
32x31/2	2411/16	2311/1a	231%10	21%10	24	810x90-23%ie
34x31/2	2611/16	251 1/1a	251316	23%ia	26	870x90—25%
36x31/2	2811/16	2711/16	2713/16	1000000	28	910x90—27%
30x4	2111/16	2011/16	20%	1	21	
32x4	2311/10	2211/10	2256	20	23	
34x4	2511/16	2411/10	24%	22	25	875×105—25%
36x4	2711/10	2611/10	2654	24	27	915x105-27%
32x41/2	2221/82	2121/ag	2156	100		820x120-211764
34x4%	2421/112	2321/62	231/2	2017/16	235964	880x120-234764
36x41/2	2621/82	2521/32	251/2	221916	255%4	920x120-25%e
34 x5	2721/12	2221/62		1915ie	225%4	
36x5	2521/62	2421/42		211910	245%4	
36x51/2	2421/82	2321/n2				935x135-24%4
37x5½	2521/82	2421/02			24%	

#### METRIC AND APPROXIMATE AMERICAN SIZES OF CLINCHER TIRES.

30 x 3¼	815 x 105	32 x 4
32 x 3%	875 x 105	34 x 4
34 x 3½	915 x 105	36 z 4
29 x 3½	820 x 120	32 x 4%
31 x 3½	850 x 120	38 x 41/6
32 x 3½	880 x 120	84 ± 456
34 x 31/6	920 x 120	36 x 41/2 or 5
36 x 3½	1020 x 120	40 x 436 or 5
38 x 3½	1080 x 120	44 x 4% or 5
40 x 336	985 x 125	36 x 51/4
	32 x 3¼ 34 x 3¼ 29 x 3½ 31 x 3½ 32 x 3½ 34 x 3½ 36 x 3½ 38 x 3½	32 x 334 875 x 105 34 x 334 915 x 105 29 x 334 820 x 120 31 x 334 850 x 120 32 x 334 880 x 120 34 x 334 920 x 120 38 x 334 1020 x 120 38 x 334 1080 x 120

# New Vehicles & Parts

#### The Pierce "Thirty," Model K.

This new car has been placed upon the market by the Pierce Motor Company, of Racine, Wis., and is to be sold at a moderate price, \$1,750. The manufacturers have been building gasoline motors for a great number of years, and the car has, therefore, a great deal of motor experience back of it.

The motor is four cylinder, vertical, the cylinders being cast in pairs with integral water jackets. The bore is 4¼ inches, the stroke 5 inches and the rated horse power 30. The cylinders are mounted upon an aluminum crank case which contains all the working parts, and the bottom half of which holds the oil reservoir. By removing this bottom half access may be had to the crank shaft, cam shafts, gears, oil pump and connecting rods. The crank shaft is a heat treated drop forging with carefully ground bearings. All reciprocating parts are balanced, producing a quiet and smooth running motor.

Lubrification of all moving parts is by splash. The oil in the crank case is maintained at a constant level by a positive gear driven pump which takes oil from the reservoir and forces it into the crank case at all speeds of the motor. A Stromberg carburetor, with double adjustment, and Remy magneto with battery reserve provide for the mixture and ignition respectively.

The valves are large, taper seated and are placed in side pockets, the admission on one side and the exhaust on the opposite side of motor. All valves are easily removed for inspection or grinding. The push rods carry an adjusting screw and lock nut, and are fitted with a fibre washer to eliminate noise.

A positive and constant circulation of the cooling water is obtained by means of a gear driven pump. The honeycomb radia-



PIERCE "THIRTY," MODEL K, FOR 1910.

tor is claimed to be sufficiently large to cool the motor under the most trying conditions.

A multiple disc clutch, composed of thirtynine saw steel discs running in oil, transmits the power from the motor to the transmission. This clutch is claimed to engage with the greatest smoothness and to be positive in its action. Universal joints are placed between the clutch and transmission and between the transmission and drive shaft, to allow for any twisting of the frame due to unevenness of the road and to spring action. The transmission is selective, with three forward speeds and one reverse. Any speed may be engaged regardless of the others, and the reverse is locked and cannot be entered by accident.

The drive shaft is housed in the torsion tube and transmits the power to the differential gears housed in the rear axle. This axle is semi-floating and claimed to be of extremely strong construction. The front axle is a one piece drop forging of I section; it is the lowest point on the car, and has a clearance of 10 inches. The vehicle has a standard tread, 56 inches.

The front springs are semi-elliptic, 40 inches long, and the rear semi-elliptic, triple action, 50 inches long. The distribution of

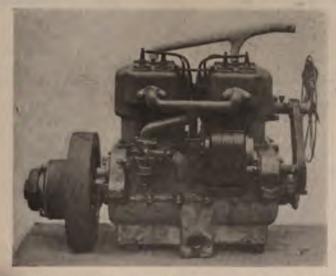
weight on the springs, combined with a wheel base of 112 inches, is claimed to give an extremely easy riding car.

The wheels are 34 inches in diameter and are equipped both front and rear with quick detachable rims and 4 inch tires. The rear wheels carry the brake drums upon which the four brakes act, one set expanding internally and operated by a hand lever, the other set contracting externally, operated by a foot pedal. The drums are 14 inches in diameter by 2 inch face, and both sets of brakes are powerful enough to hold the car on any grade.

The steering gear is of the worm and sector type, fitted with a 16 inch hand wheel which carries the spark and throttle levers. A foot throttle and muffler cut-out are supplied as well

The body holds five passengers without any crowding. No pains have been spared to make the upholstery and finish high class. The body and gear are finished in Brewster green, with hairline cream stripe; the wheels are cream yellow.

The equipment furnished with the car is generous, consisting of Rushmore gas head lamps, oil side and tail lamps, Prest-O-Lite gas tank, horn, robe rail, jack, tire repair kit and full complement of tools.





Admission side of motor, showing magneto, carburetor and clutch.

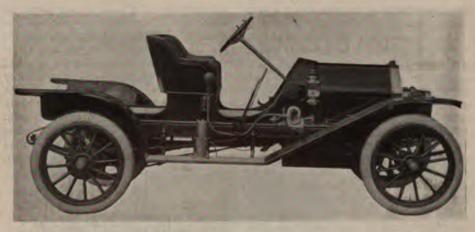
Exhaust side of motor, showing water pump.

PIERCE THIRTY HORSE POWER, FOUR CYLINDER MOTOR.

#### e New Overland Runabout.

unabout of entirely new design is produced by the Overland Automompany, of Toledo, Ohio. This new nade to sell at \$1,000, with either sindouble bucket rumble seats or with conneau. It is fitted with a four cylfour cycle, water cooled motor of the bore and 4½ inch stroke.

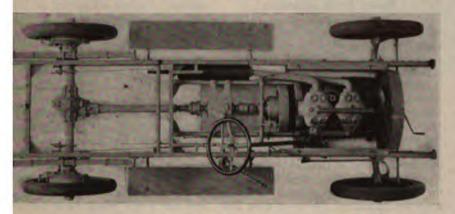
cylinders are cast separate with the all on one side and operated by a cam shaft. The cylinders are gray ough bored, left to season and then I to size. The valve seats and chams well as the cylinder heads, are ensurrounded by water, thus increasing oling surfaces. The spark plugs are I in the inlet chamber caps. The is taken into the cylinder water at the bottom on the right hand if the motor and discharged at the the jacket over the cylinder heads.



THE NEW OVERLAND RUNABOUT.

ly through the wall of the hollow pin—a piece of spring wire is twisted around the screw. This is accomplished by putting the straight piece of wire through the hole in The piston pin end is fitted with a phosphorbronze bushing, and is milled out on top to form a basin in which to catch oil for lubricating the piston pin. The lower or crank shaft end is fitted with die cast bushings of special composition. Two studs screwed and riveted into the connecting rod proper hold the connecting rod cap, which is of the marine type. Shims are provided for taking up the bearings. The caps are held in place by castellated nuts and cotter pins. The lower connecting rod bearings are 1½ inches in diameter and 2½ inches long.

The valves have nickel steel heads, electrically welded to twenty-five point carbon steel stems. They are 1¾ inches in diameter; the stems are three-eighths inch in diameter, and both are ground to size. The valves are actuated by the cams through square lifters working in white metal bushed guides. The lifters are drilled and tapped in the top, and a hardened screw provided with a lock nut is inserted for valve adjustment. The cam shaft is fifteen-sixteenths inch in diameter, of high carbon



PIERCE MODEL K CHASSIS.

a system of circulation is used. The quantity of water used in the system prising, only 4½ gallons, and it is d that the motor never runs hot. A I tube radiator, together with a four ball bearing, flat belt driven fancetes the cooling system. The fant is supported on top of the gear rtment, and is independent of the or in every way. The belt is adjusted ans of an eccentric at the top of the racket. The fan is driven from a on the crank shaft, and runs two and ird times the speed of the motor, .

pistons are of the same material as linders, and are provided with three ric compression rings above the piston and three oil grooves below for dising the oil. The piston is flat on top as four ribs underneath the head, iston pin is three-quarters inch in dir. It is made hollow for the purpose ing lubrication, the hollow ends being resunk at a wide angle to offer as litstruction to the oil as possible, and o form the centres on which the pins round. The pins are of nickel steel, and ground to size.

piston pin is held in place by a sinrew with a hole in the top. After rew is in place its point passes entirethe top of the set screw and turning the screw several turns.

The connecting rod is drop forged of forty point carbon steel, and is of I section.



FRONT VIEW OF OVERLAND RUNABOUT.

steel, hardened and ground, with the cams forged integral, and three liberal bearings. The front bearing is 25% inches long; the centre 35% inches long and the rear bearing 23% inches long.

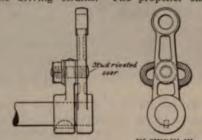
The crank shaft is a drop forging of forty point carbon steel. It is heat treated, and all bearings are ground to size. It has five main bearings, which are 1½ inches in diameter. Four of the bearings are 2½ inches long each, and the rear bearing is 3½ inches long. The crank shaft gear is of steel, with spiral teeth and keyed to the shaft. The gears, of which there are four, are housed in an oiltight compartment in the front of the crank case,

Lubrication of the moving parts is effected by means of a mechanical oiler, driven from the rear end of the cam shaft and by splash in the crank case. A stand pipe is provided by which to gauge the oil level in the crank case. The crank case is cast from an aluminum alloy in two parts, the upper portion containing all the crank shaft bearings, which are independent of the lower half. The lower half serves simply as an oil pan. Drain cocks are provided in the bottom of the lower half for drawing off the oil when desired. The flywheel is of cast iron, with fan spokes, and in the coupling attached to the flywheel is the only universal joint in the propeller shaft line.

The motor has a three point suspension, two points of support being at the rear and one under the centre at the front. Located in the centre of the inlet manifold is the Schebler carburetor, which is quite accessible for adjustment. The cylinders are offset from the centre of the crank shaft to reduce the angularity of the connecting rods on the power stroke.

The cross member of the frame immediately back of the motor deserves particular mention, since it forms the forward support of the propeller shaft and torque tube. This member is of malleable iron, and combines

the functions of a large number of pieces. Right here it may be added that there are no holes in this frame except those used for the frame rivets. The torque tube is attached to this cross member by a yoked swivel joint. At this swivel joint, between the propeller shaft and the flywheel, is the only universal joint in the propeller shaft. Two strong truss rods run from this point back to the rear axle brake flanges, holding the rear axle in alignment and transmitting the driving strains. The propeller shaft,



BRAKE LEVER ASSEMBLY.

between the universal joint and the change gear, is supported on roller bearings inside the torque tube. The change gear, which is planetary, is located on the rear axle, and is operated entirely by pedals. It is so arranged that by applying the slow speed the high is automatically released and vice versa. The only hand lever to operate is the emergency brake lever, the entire control being by pedals. One pedal operates both the low forward speed and the reverse; another pedal the high speed and a third the brake, making three all told. The change gears run in oil, and the direct drive gear shaft is carried on annular ball bearings. The high speed clutch is of the plate type, and can be tightened or loosened through a hand hole with the fingers. The direct drive bevel pinion is keyed to the direct drive shaft, and meshes directly with the large bevel driven gear on the differential

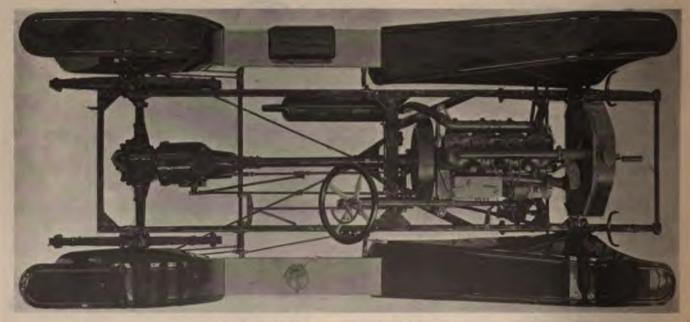
casing. The differential is of the bevel pinion type, and is supported on roller bearings, with ball thrust bearings on both sides. The axle shafts run on roller bearings, and the wheels are fitted to them by means of a taper, key, nut and lock nut.

The front axle is a one piece drop forging of I section. The spring pads are milled to conform to the shape of the spring and are forged integral. The frame is of pressed steel of 334 inch channel section, 134 inches wide and five-thirty-second inch thick. It is strongly braced, the braces to the centre member of the frame forming the rear supports for the motor. The radiator is carried above the front cross member on two artillery trunnions, which, by allowing a slight swinging motion, entirely frees the radiator from all strains due to road shocks. With merely two bearings to remove the task of dismounting the radiator is an easy one, since it is held in position by only four cap screws. The radiator brackets are carried on the upper part of the frame, and the same castings also carry the lamp brackets and fenders. A front bar extending between the springs prevents swaying, and serves to protect the lamps and the radiator, as well as to add strength to the forward portion of the frame.

The 16 inch steering wheel works through a worm and gear. The gear is a full wheel, so that by removing the steering arm and turning the steering wheel three complete revolutions a new bearing surface is obtained. There are ball thrust washers both above and below the worm. The ball and socket joints are so designed that it is impossible for them to loosen and for the rod to drop off.

The wheels are of the artillery type, with twelve 11/4 inch spokes and 32x31/2 inch tires. The wheel base is 102 inches and the tread 56 inches.

The brakes are internal expanding and



OVERLAND RUNABOUT-PLAN OF CHASSIS.

external contracting, respectively, both operating through equalizers to the rear wheel brake drums. The main brake shaft has a long bearing in the upper portion of the rear step hangers, which not only makes the operation of the brakes firm and easy but greatly adds to the strength of the step. The provision for adjustment of the brakes is unique. It consists of a small pad on the side of the brake lever, which has ratchet teeth milled in its face, and teeth to coincide on the lever, and advancing or retarding this lever tightens and loosens the brakes. This arrangement is locked in place by a nut and lock washer. The internal brakes, operated by a hand lever at the driver's right, are the emergency brakes. The external brakes, operated by a pedal, are the service brakes.

The front springs are semi-elliptic, 36 inches long and 134 inches wide. The rear springs are double scroll full elliptic, 36 inches long and 134 inches wide.

The spark and throttle control lever are located on a stationary quadrant on top of the steering wheel. The dual ignition system, with a single set of spark plugs, is used, the batteries working through the magneto distributor.

Dark blue is the standard color. Each car will be equipped with two gas head lights, two side oil lamps, one oil tail lamp, generator, horn, tire pump, tire repair kit and full tool kit. The cars are ready for immediate delivery.

#### Improved Line of Hoyt Pocket Meters.

So widespread has the use of batteries become that the demand for small pocket meters with which to test them has grown to considerable proportions. The Hoyt Electrical Instrument Works, of Penacook, N. H., early recognized the importance of this field, and have just added a line of immeters and voltmeters approximately the size of a gentleman's No. 16 watch, the novel feature of which is a silver plated metal scale, which is claimed to combine accuracy, durability and tastiness in design.

Realizing that the first requisite was a careful standardization of every part, they have for some time been working along these lines, and they claim to have designed

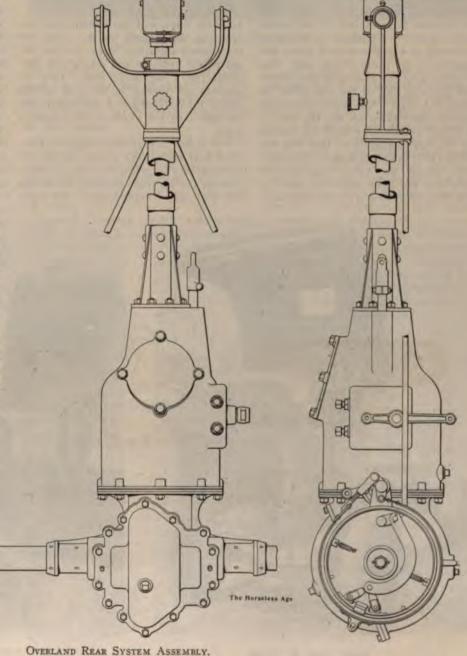


every part so carefully that exhaustive tests have failed to show any material error in any part of the scale.

These meters are of the permanent magnet type, and in designing them the purpose of their use has been constantly kept in mind. The relation of the moving system to the poles of the permanent magnet is said to be such as to insure a practically dead beat movement, with extreme sensitiveness to current changes. The case is substantially made in one piece to insure rigidity and mechanical accuracy,

A novel design of lettering has been adopted for the dial, and it is the purpose of the makers to carry out the same idea in all instruments of this type to readily distinguish them from other meters of somewhat similar, general appearance.

The United States Motor Truck Company, a newly organized concern of Cincinnati, Ohio, has elected the following officers: Alfred Hill, president; Herman Erdman, vice president; Harry L. Manss, treasurer, and Jesse Lowman, secretary. The company is at present looking for a suitable factory.



#### The Gramm-Logan Motor Trucks.

Only very slight changes have been made on the Gramm-Logan trucks manufactured by the Gramm-Logan Motor Car Company, Bowling Green, Ohio. The changes made are designed to secure greater accessibility of the different parts without sacrificing loading space. The company build heavy 3 ton trucks, buses and light delivery wagons of 1,500 pounds capacity. Since there are but slight differences (except as to size) in the chasses of the different types it will suffice to describe the 3 ton car.

The motor is a four cylinder, four cycle, water cooled one. The cylinders are of gray iron, cast in pairs, with the valves all on one side. The bore is 43/4 inches and the stroke 5 inches. The cylinders are offset from the centre of the crank shaft. Cooling is effected by means of a centrifugal circulating pump, a ball bearing, belt driven fan and a tubular radiator, the radiator being located at the extreme forward end of the frame and protected by a bumper. Lubrication is effected by a self contained pump and reservoir in the lower crank case. The oil pump is of the gear type and driven from the rear end of the cam shaft, as is also the timer. The water pump and magneto are located on the left side of the motor, and between these are located two oil supply gauges, so that one can readily tell if the oil is properly flowing.

The pistons are extra long and are made from the same quality of metal as the cylinders. They are fitted with four



GRAMM-LOGAN MOTOR OMNIBUS.

eccentric rings, with lap joints, which are returned and ground on the sides and the bearing surfaces. They are then fitted to the cylinder and piston and subjected to a tightness test. Five oil grooves are turned in the side of the piston for collecting and distributing the oil splash to the inside of the cylinder walls.

The crank shaft is drop forged of alloy steel, heat treated and ground to size. It is fitted with centrifugal oil rings, which prevent the oil from working out of the end bearings. Thrust bearings are fitted on both the front and rear ends to take up the thrust of the clutch. The connecting rod is a drop forging. The bearing caps and bushings are retained with two nickel steel bolts, which are secured with a special locking device. The cam shaft is also a drop forging, with the cams forged integral, and has three white bronze bearings, which are lubricated from oil pockets in the crank case. The exhaust manifold and intake are both located on the same side, and are held in place by the same studs and clamps.

The carburetor is located on the right



FRONT VIEW OF TRUCK.



FRONT PORTION OF TRUCK,

hand side of the motor and in the centre of the intake manifold. The dual system of ignition is used with a single set of spark plugs, using a Splitdorf magneto

and a storage battery.

The crank case is of aluminum alloy, in two pieces. The gears are located in an oil tight compartment at the front end of the motor, which is cast integral with the upper portion of the crank case. The lower portion contains the two end bearings of the crank shaft and the oil res-

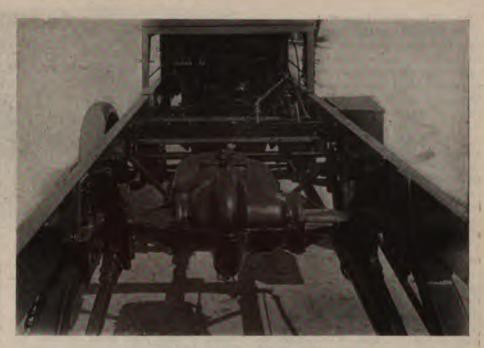
ervoir and pump. The clutch is composed of thirty-four steel discs, seventeen large and seventeen small ones, which run in oil. This member is contained in a round case bolted to the back of the motor flywheel. Between the clutch and the change gear is located a double universal joint of the block and trunnion type. The gear set is of the progressive gear type, with three speeds forward and reverse, and enclosed in a malleable iron case, together with the jack shaft and differential. Timken roller bearings are fitted throughout. gears are of nickel steel and hardened. The gear ratio on the high speed is nine to one at the rear wheels. The differential is of the bevel pinion type, and is supported on Timken bearings, as are

also the outer ends of the jack shaft. The sprockets on the jack shaft are thirteen or fifteen teeth, 11/2 inch pitch and eleven-sixteenth inch thick. The rear wheel sprockets are forty-two teeth malleable castings, of 11/2 inch pitch and eleven-sixteenth inch thick. Diamond speeds forward and reverse, and enclosed in a malleable iron case, together with the jack shaft and differential. Timken roller bearings are fitted throughout. The gears are of nickel steel and hardened. The gear ratio on the high speed is 9 to 1 at the rear wheels. The differential is of the bevel pinion type and is supported on Timken bearings, as are also the outer ends of the jack shaft,

The sprockets on the jack shaft are 13 or 15 teeth, 11/2 inches pitch and elevensixteenths of an inch thick. The rear wheel sprockets are 42 teeth malleable castings of 13/2 inch pitch and eleven-sixteenths of an inch thick. Diamond chains are used for the drive to the rear wheels. They are of 11/2 inch pitch, three-quarters of an inch roller and three-quarters of an inch wide.

There are two sets of brakes. The service or foot brakes operate on the jack shaft drum, while the emergency or hand brakes are internal expanding and operate on the rear wheel brake drums. The car is guided by a 20 inch steering wheel, underneath which are the spark and throttle control levers.

The motor is located at the very forward end of the frame and directly beneath the driver's seat. The gasoline tank is located under the seat proper and holds 18 gallons. The rear axle is made of 31/4 inch solid round machine steel, with very large Timken bearings on the spindles. The front



REAR VIEW OF GRAMM-LOGAN TRUCK CHASSIS.

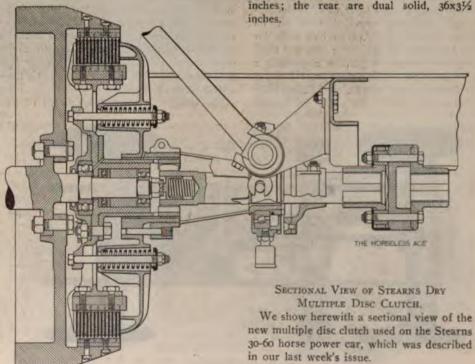
axle is of high carbon steel, yoked at the ends for the steering knuckles. It is 21/2 inches square. The spindles are also fitted with Timken roller bearings, which carry the front wheels.

The frame is constructed of 5 inch steel of channel section and joined at the corners by steel castings, and riveted with five-sixteenth of an inch rivets. The loading space is 5x11 feet and the wheel base 120 inches.

The front springs are semi-elliptic and are hung from the frame by steel castings and steel bolts. The rear bolts pass

through rollers which are of 21/2 inch outside diameter and a little over three-quarters of an inch inside diameter These rollers take the place of shackles as ordinarily used. The springs are 40 inches long and 31/2 inches wide and have nine leaves; they are fastened to the axle by steel castings and clips. The rear springs are of the platform type and are hung the same as the front springs, except that the rear cross member is connected to the side members by shackles and shackle bolts.

Either pressed steel or artillery type wheels are furnished, with felloes full width of the rim. The tread is 66 inches. The front tires are solid singles, 36x5 inches; the rear are dual solid, 36x31/2



The 1910 Hupmobile.

The Hupp Motor Car Company, of Detroit, Mich., have just made public the features of their new model for 1910, known as Model B. The car retains the same lines as the original Hupmobile model, but has been improved in several details, as will appear from the following description.

The wheel base is 86 inches, the tread standard, and the car is fitted with 30x3 inch G & J tires. The minimum road clearing is 11 inches, which is under the axles, while the flywheel clears the road by 13 inches. Among the improvements in the new model is the adoption of an oval gasoline tank mounted on the body with its greatest diameter vertical. This tank has a capacity of 11 gallons, and is arranged back of the seat in such a position that there will be plenty of head for feeding gasoline to the carburetor even on the steepest hills. The weight of the car complete is given as 1,100 pounds, and its speed range as up to 50 miles per hour. The price of the car, with an equipment including oil lamps, tools, etc., is \$750.

The four cylinder motor is of 31/4 inches bore by 33% inches stroke, and is rated at 16-20 horse power. The crank shaft, which is made from 30 point carbon steel, is 11/4 inches in diameter, and is offset threeeighths of an inch from the centre of the cylinders. To a taper seat at the forward end of the shaft is keyed a 40 pound flywheel of 14 inches diameter, which is cast with fan blades. The connecting rods are I section drop forgings. The rods are bushed with Parsons bronze, and the caps are provided with oil scoops to insure lubrication of the crank pin bearings. The piston pins are hardened and ground, and are fastened in the rod by cone-pointed set screws, while they have their bearings in the piston bosses. The pistons are 3% inches long, ground taper to allow for unequal expansion, provided with an oil groove seven-eighths of an inch wide for the lubrication of the piston pins and fitted with three eccentric packing rings with a 45 degree joint. The valves are 11/2 inches in diameter, bevel seated, of the electrically welded type. All of the valves are located



HUPMOBILE 1910 MODEL

on the left side of the motor. The spark plugs are located over the inlet valves and the priming cups over the exhaust valves. The inlet and exhaust manifolds are made of cast iron, and are held in place by four clamps, a tight point being obtained by means of copper-asbestos gaskets. Provisions are made for admitting warm air from around the exhaust manifolds to the carburetor whenever the weather is cool, but in warm weather cold air can be admitted directly by the removal of a 1 inch pipe plug.

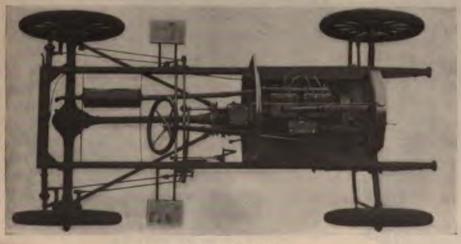
The cam shaft is made integral with its cams, and is hardened and ground. It is babbitted in place in a cast iron side plate extending the full length of the motor, as shown by one of the illustrations herewith. When this plate is removed free access is obtained to the connecting rods. This shaft is carried in five bearings which are lubricated by the splash in the crank case. The valve push rods also have their bearing in this plate. These push rods have their lower ends, where they make contact with the cams, milled on a radius, so as to give substantially the same effect as is obtained with a roller, and fibre blocks are inserted in the upper ends where contact is made with the valve stems. The cam shaft gear is of gray fibre reinforced with steel, and meshes with a steel crank shaft pinion.

The ignition is effected by means of a

Bosch high tension magneto, which is mounted on a ledge on the side cover and driven by an enclosed gear on the armature shaft, which meshes with the cam shaft gear. The spark timing is fixed. Ignition is controlled by means of a cut-out switch on the dashboard.

The engine is oiled by means of splash in the crank case. Oil pockets are provided over the crank shaft bearings and the bearings in the change speed gear. The oil working through the front crank case bearing is returned to the crank case by means of a return drain. The crank case is divided into two compartments, each of which has a drain cock. Oil is fed to these compartments by an oiler cast integral with the inlet water lead. The oiler is of such construction that its feed automatically increases with the opening of the throttle valve, and is stopped entirely when the throttle is closed. The thermo-siphon system of circulating the cooling water is employed, and about 3 gallons of water is carried. The radiator is of the same general construction as last year, but the number of vertical tubes has been increased from four to five, and the intermediate tank has been increased in size. The radiator is now provided with a filler tube of slightly curved taper, which is considered to improve the outline. The water flows from the top of the cylinder jackets to a tank 8 inches from the top of the radiator, extending half way through and not visible from the front. It is stated that the fact that the hot water returning from the motor must pass through radiator tubes 4 inches long before it reaches the top of the radiator prevents the escape of steam. The speed of the motor is ordinarily controlled by an accelerator pedal, and there is also a throttle lever underneath the steering wheel.

One of the most important changes in the new model Hupmobile consists of the adoption of a multiple disc clutch. The latter consists of nine saw blade discs, and is enclosed in the change gear case, so that it runs in an oil bath. The latter case is made of cast iron and bolted to the rear end of the crank case, as seen in the illustration. The change speed gear is of the sliding type, with two forward speeds and

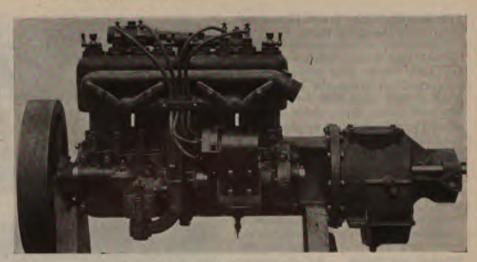


PLAN OF CHASSIS.

one reverse. It is possible to move from the neutral position directly into any forward position or the reverse. The gear raties for the low forward and the reverse gears are the same, the ratio of reduction from the high speed being 2.7 to 1. The gears of the change gear are made from 20 point carbon steel and are case hardened. In the rear end of the gear case there is a large cylindrical bearing which fits over the spherical housing of the propeller shaft, providing a dustproof joint, and at the same time taking up the torsion of the rear axle drive. Two radius rods extend diagonally from the rear brake support to sockets in the gear case.

The rear axle housing consists of 2½ inch steel tubing with ½ inch walls. These tubes are pressed and riveted into the bevel gear housing. The rear axle shafts are 1½ inches in diameter, and are carried on Hyatt roller bearings at the wheel ends, and two point ball bearings at the inner ends. The driving pinion and the differential pinion are of 3½ per cent. nickel steel, case hardened. The gear wheels are of 30 point carbon steel, also case hardened. The bevel gears have 12 and 48 teeth respectively. The bevel pinion is electrically welded to its shaft, which latter is supported on New Departure ball bearings.

A rather important change has also been made in the design of the front axle, which



LEFT SIDE OF MOTOR AND GEAR BOX.

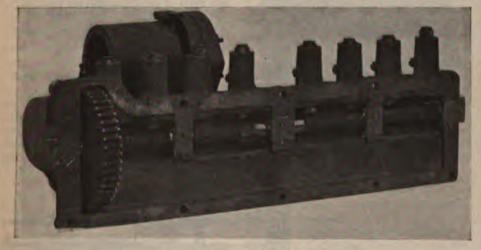
these sockets encloses a coil spring designed to absorb road shocks. It is claimed that with this steering mechanism the play of the springs has no perceptible effect on the steering wheel. The steering gear housing is riveted to the front cross member of the frame.

A single cross spring is used at the rear which is of the inverted double sweep type, and has a ball socket clipped to it in the middle for taking a ball ended bolt that seats in a bracket in the middle of the rear frame member, thus affording a three point

The method of holding this tread on the tire differs considerably from that of the well known Woodworth adjustable tread. A number of galvanized steel plates are riveted along each side of the tread a short distance apart, connected by short and very stiff springs. Each spring is linked to one end of the plate and has a hook on the other end. The tread is applied by slipping it sidewise over the deflated tire with the springs unhooked. After the tread is in place the springs are hooked, connecting the plates and forming a ring on each side. As the tire fills out the springs are stretched, holding the cover tight on the tire, and always ready to take up any slack.

Besides the new adjustment, the improved self-adjusting treads have the leather treated by a new process which, the makers state, they found by experience to double the life of the leather, preventing the action of dirt and water from affecting it. The new leather is of a very dark green color.

The rivets used in the middle of the protector have thicker heads than have been used in other treads, adding greatly to the mileage. They have the corners rounded off so that they cannot be caught in such a way as to be forced out of the leather. The leather on each side of the heavy rivet is studded with flat head rivets which do not materially increase the weight, but protect the leather in ruts or on rocky or stony roads.



CAM SHAFT AND HOUSING.

is now an I section drop forging made from 40 point carbon steel and heat treated. The steering heads are forged integral with the axle itself. The steering spindles are drop forgings 1 th inches in diameter, and are provided with two point adjustable ball bearings.

The car is equipped with two double sets of brakes, both of the internal expanding, cam-actuated type, mounted side by side on the rear wheel hubs. The brake shoes are faced with Thermoid brake lining. One set of brakes is operated by a pedal and the other by a hand lever. The steering gear is of the rack and pinion type. The race has a straight line connection with the axle steering arm through a drag link with heavy adjustable ball sockets at both ends. One of

support. The eyes of the spring are pivoted to sliding journals which have a bearing on a cross bar parallel with the axle, and are supported by arms extending rearward from the brake support. Back of each of these journals is a compression spring which exerts a pressure outward, thus tending to deflect the cross spring and having a retarding effect on the rebound. In front the frame is supported by 34 inch semi-elliptic springs shackled at the rear end.

#### The Woodworth Treads for 1910.

The Leather Tire Goods Company, Niagara Falls, N. Y., have just brought out a new style of tire for 1910 called the Woodworth improved self-adjusting tread.



THE WOODWORTH TREAD.

## The Saurer Motor Truck Fitted for

a Dumping Body.

This machine is conservatively rated at between 3 and 5 tons. The wheel base is 153 inches and the tread 64 inches. The front wheels are 36 inches in diameter and carry 41/2 inch single solid tires. The 42 inch rear wheels carry double 41/2 inch tires. The motor is a four cylider, 41/8x51/2 inch, and rated at 30 horse power, foreign rating. It is fitted with the Saurer compressed air self-starting device and also with a motor braking attachment. The self-starting device is of that type in which air is admitted through a special valve on every working stroke. Transmission is through a cone clutch and a four speed selective gear box to a countershaft, and thence by side chains.

The construction of the dumping device is quite clearly shown in the photograph. The body is pivoted to the rear of the chassis frame, and the tilting is accomplished by a rather ingenious double telescope screw operated by a crank on the left of the chassis. The construction is as follows: The lower and larger screw is revolved in a stationary nut by means of a bevel gear feathered to it, and which is revolved in turn by another gear affixed to the hand operated crank shaft. The casing which encloses the bevel gear is arranged to allow a slight movement around an axis which is common to the transverse crank shaft. Inside the main screw is another which is threaded oppositely to the main one, and which is secured at its upper end to the body frame in such a manner as to prevent its revolution, but to allow of a slight fore and and aft movement around the axis of the bolt which secures it. It will be seen that as the main screw revolves in its nut in such a direction as to raise itself the upper screw will revolve in the threaded hole of the main screw and will be raised relative to the main screw. This



SAURER TRUCK WITH DUMPING BODY FRAME.

device is much more compact than a single screw for the purpose. In practice the screws are protected with a telescoping canvas covering which was removed to show the construction more clearly.

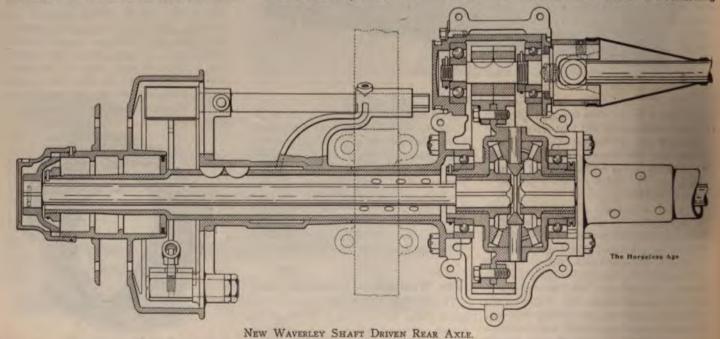
#### The New Drive of the Waverley Company.

In our issue of October 6 we described the new electric models of the Waverley Company, of Indianapolis, Ind., which are characterized by a new shaft drive. We show herewith a sectional view of the rear axle and driving gear. As will be seen from this cut, a shaft from the motor, which is hung from the vehicle frame, extends crosswise of the chassis and connects throught compact universal joint with the shaft of the driving pinion. The driving pinion as well as the differential gear is carried in annular ball bearings. The driving gears are of the herringbone type, which insures noiseless operation. The rear axle

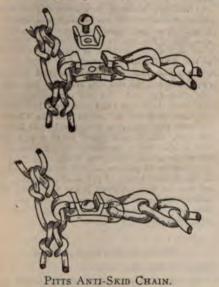
construction is of the floating type, an adaptation from gasoline vehicle practice. The rear wheel hubs run on the outside of the axle tubing on Timken roller bearings, which are not shown in the drawing. It will be noticed that the brake drums are integral with the hubs. The driving gear is, of course, set to one side of the centre of the rear axle so as to make the propeller shaft as long as possible and reduce the action and wear of the universal joints. The side gears of the differential are fitted to the rear axle shafts with square joints, and the shafts may be withdrawn without disturbing the other parts of the axle.

#### The Pitts Anti-Skid Chain and Connections.

The Pitts Anti-Skid Chain Company, 2422 Michigan avenue, Chicago, have placed on the market a new tire chain in which the cross chains are connected in a novel manner. The cuts show one of the connecting



members open and closed. This member is simply a double ended hook, and is closed by bolting to it a U-shaped piece of metal made to fit the opening in the hook. The ease of replacing worn or broken cross



chains and the possibility of adding extra ones when the going is unusually bad are among the advantages claimed by the makers. The simplicity of the device is also claimed to be a strong point in its favor. The cross chains are hardened and copper oxidized to prevent rusting. After the chains are worn, and have in consequence become slack, they may be tightened by putting on more cross chains. The chain links are electrically welded. These chains come put up in canvas bags, and a number of extra cross chains are furnished with each set.

#### To Make Auto Fenders.

Another industry was added to the long list of concerns engaged in making automobile accessories by the incorporation of the Welton Auto Fender Company, with a capital of \$20,000, under Ohio laws. The company has opened an office in the Columbus Savings and Trust building, Columbus, Ohio, and a factory may be located there at



WELTON AUTO FENDER.

a later date. The corporation holds the patents to an automobile fender which is claimed to aid in protecting the lives of pedestrians and also preserve motor cars from serious injury in accidents. The company has equipped a number of cars with

the device, which consists of a strong steel frame covered with a heavy cushion of rubber. The device is adjusted in such a manner to the front of the car as to cast aside any persons that might be struck. The incorporators of the company are D. J. Welton, George G. Welton, J. W. Howe, H. H. Ebright and S. W. Gilliland.

#### The Alexander Wind Brake.

The J. Alexander Company, 1931 Broadway. New York, are manufacturing a wind "brake" or shield, which is something of a novelty in accessories of this class. As the cut shows, the "brake" is a screen of fine wire mesh, 14 inches in diameter, attached to the steering post, which serves to protect the face of the driver from sand, dust, insects, and break the force of the wind. At the same time the air resistance involved in its use is not so great as in the case of a glass shield of the some size, for instance. The appliance is regularly furnished with a dull gun metal finish, which obviates the dazzling reflections which might be encountered if a nickel or bright brass finish were used. Among the advantages claimed for



THE ALEXANDER WIND BRAKE,

this shield over the ordinary glass shield are less air resistance, no reflections and less liability of breakage.

#### New Six Cylinder Roadster to Be Made in Detroit.

The latest addition to the numerous types of cars made in the centre of the American automobile industry is to be known as the Anhut Light Six-Thirty-Six, which will be made by the Anhut Motor Car Company, whose incorporation is reported in another part of this issue. The first car of the company made its appearance on the streets of Detroit last week. It is a powerful light roadster of pleasing lines, and is claimed to develop a speed of 60 m. p. h. The company is headed by Senator John M. Anhut, who is its president, and the other officers are: Mayor Philip Breitmeyer, vice president; Charles Lansby, treasurer, and H. H. Thorpe, secretary. The company has secured a factory at 206-212 Howard street, abutting on the Michigan Central Railroad, which covers an area of 70x300 feet. The car is to sell at \$1,600, and it is planned to turn out from 500 to 1,000 for next year.

#### Dealers' Number of Rambler Magazine.

The last issue to hand of the Rambler Magazine, published by Thomas B. Jeffery & Co., of Kenosha, Wis., is a special Dealers' Number, and is a very creditable production. It is printed in colors on heavy coated paper, and is profusely illustrated with touring scenes, factory views and illustrations of the new Rambler models. The book contains a picture of the Rambler factory, claimed to be the largest automobile plant in the world, a portrait of Thomas B. Jeffery, the announcement of the new Rambler, the details of all the special Rambler features, an illustrated story of the methods of making and testing of Ramblers, a story of the sales organization, and the record made by this concern during the past nine years. Copies of the issue are sent free to all dealers upon request.

Diamond Rubber Company Doubles Capital.

The stockholders of the Diamond Rubber Company of Akron, Ohio, recently received a stock dividend of 100 per cent., which doubled their holdings in the company. A paper was filed with the Secretary of State of Ohio increasing the capitalization of the company from \$5,000,000 to \$10,000,000. In addition to the stock dividend a cash dividend of 10 per cent, was declared. The stock dividend is the second of its kind, as in 1907 a dividend which increased the capital from \$3,500,000 to \$5,000,000 was declared. Previous to the stock dividend the stock sold at \$340 a share. The company operates the Bryant Steel Wheel and Rim Company in Columbus besides its tire plant in Akron.

Dispute Over Factory.

An interesting controversy has arisen over possession of the former plant of the Standard Wheel Company, in Indianapolis, which is occupied by the Parry Automobile Company. The C. M. Krouse Company claims that it has a lease on the building, although the automobile company leased it for ten years recently. Employees of the Krouse Company attempted to move machinery into the building a few nights ago, with the result that four of the men were arrested for malicious trespass. The question of the lease will be settled in the courts soon.

Arrangements are being made to inaugurate on December 1 a motor mail between Edinburgh and Glasgow, one van leaving Edinburgh at 10:35 p. m. and arriving in Glasgow at 6 a, m., while another will leave Glasgow at 9:30 p. m. and arrive at Edinburgh at 3:30 p. m., each making one trip daily.



#### Tire Tread Construction.

Editor Horseless Age:

One of the most serious problems which at present confront the motorist is that of reducing the expense of renewing the tires. For years the price of rubber has constantly advanced, and with it the price of tires, and with the rapidly increasing number of automobiles it does not seem likely that there will be any reduction in tire prices unless the production of rubber is enormously increased.

I would like to ask if you or any of your readers can inform me whether any substitute has ever been proposed for rubber in the manufacture of the shoes or outside portions of the tires. While it is true that there is probably no substitute for rubber for manufacturing the inner tube, it seems to me that inasmuch as the entire strength of the shoe or outer case depends upon the fabric of which it is constructed, and the rubber is incorporated with the fabric mainly for the purpose of protecting it from the action of water, some substitute for rubber might be used which would be very much less expensive and almost equally efficacious. I understand that there have been a good many arguments put forward to prove that the rubber incorporated in the fabric prevents the threads of the fabric from wearing each other out, but in spite of this it is a well known fact that with a great many tires the fabric does wear out on the inside, while from the exterior the case does not show any very serious evidences of wear.

Would it not be possible, therefore, to construct a case on the lines of the familiar cotton fire hose, only having a number of extra plies woven or incorporated upon the threads thereof, and to impregnate the whole structure with some substance like linseed oil, in the manner now used in the manufacture of oilskin clothing? There are processes of weaving which can produce a structure of this sort, having all of the plies of fabric united into an integral structure, and it would seem that even if such a tire did not possess the wearing qualities of the rubber tire now universally used, it might be very much cheaper to manufacture, so that the expense of renewal would be much less in proportion to the amount of mileage. Anyone who has worn oilskins is aware of the fact that they do not tend to dry hard or to crack with age, but, on the contrary, often become very sticky, and are not lacking in flexibility, although, of course, a structure such as I suggest might not be quite so flexible as the present case.

It would seem to me that some experiments along these lines might prove interesting, and, in view of the advancing price of rubber, are well worth trying, though

eventually it might be necessary to construct the tires along different lines than tires are at present constructed.

ARRAHAM B. COX.

[You are probably aware of the fact that one or two foreign tire manufacturers incorporate steel studded leather bands, comprising three thicknesses of leather, in the tread of the tire. The object of this construction is, of course, not so much to cheapen the manufacture of the tire nor to increase its durability, but to secure nonskidding qualities without appreciably reducing the resiliency. A tire (single tube) built on those principles was manufactured a number of years ago by a rubber concern in New York city, but did not prove a success. This, of course, is not conclusive proof that the principle is not adapted for use in tire construction. We are not in position to judge the practicability of the construction described by you, and believe that only an actual test could determine its value.-ED.1

## What Put the Columbia Car Out in the Fairmount Park Race.

Editor Horseless Age:

We have noted in the various automobile trade journals that the accident which put the Columbia out of busines in the Fairmount Park races in Philadelphia on October 9 was passed over, leaving the readers to surmise that the car broke down on account of some particular weakness. We do not ask that any excuses be made for the Columbia, but we believe that it is only fair that a correct statement of facts be given, the same as in other accidents which were fully described. To that end we are enclosing herewith a copy of an article that appeared in the Philadelphia North American, issue of October 17, which is correct in every particular except that it states that Coffey went out of business during the third lap. The accident occurred during the second lap, as he had gone from fourteenth to eighth place when he passed the grand stand on the first lap. We would be pleased to have you give the car the credit of going out of business through no fault of its own. The statements in this article can be easily proven by the driver and mechanic in the Chadwick car, which was fortunate enough to finish.

THE COLUMBIA MOTOR CAR COMPANY,
Per H. W. Nuckols,
Vice President and General Manager.

#### (ENCLOSURE.)

It does not seem to be generally known just why the Columbia car discontinued running after the third lap during the recent park race. After making two laps Coffey had gone from fourteenth to eighth place with the Columbia. He was going up City Line Hill toward the turn at Belmont avenue. Preceding his car was the Chadwick, driven by Perkins.

The Chadwick turned at the sharp angle going on to Belmont avenue, and raising considerable dust at this point. In going round this point, however, his car skidded, so much so that it partly faced about in the opposite direction and blocked off the road so that there was no room to get around him without striking the car or the tree, or else running into the people.

At this point Coffey showed wonderful nerve

and quick foresight. Knowing that he would strike both he ran between the car and the tree and cut a gash in the tree 1½ inches deep with his hub cap, and also striking the Chadwick car. The damage to the Columbia was principally done by striking the tree, as this was an enormous shock.

It did not, however, break anything except to throw the rear axle out of line and bend the frame. The car could still proceed under its own power, but was in no condition to finish the race, and Coffey decided to abandon it as soon as the grand stand was reached.

In this accident the Columbia had the tires ripped off, and the two cars after this laid side by side along the road. Another car following these two would have run right into them had this car not been flagged. It appears that the Chadwick car took the turn very fast, too fast to keep on the road, and it was placed in such a position that it was utterly impossible to get around the car at the speed Coffey was going.

A number of persons at this turn have spoken

A number of persons at this turn have spoken in the highest terms of praise about Coffey, stating that he deserves great praise for saving lives, both of the spectators and those in the two cars. This same car, however, will enter the Vanderbit race, and Coffey will drive.

#### How to Correct a Skid.

Editor Horseless Age:

To settle an argument, and possibly save some future trouble, will you kindly advise through your columns, or otherwise, what would be the proper thing to do under the following circumstances: Suppose an automobile to be passing over a wet, slippery, asphalted street. Suddenly the rear end of the car skids smartly in the direction of right hand curbing. Should the steering wheel be turned to the right or to the left under such circumstances in order to straighten out and go ahead. Should the brakes be brought into use?

#### A REGULAR READER.

[We submitted this question to our contributor, H. H. Brown, who replies as follows: "The general rule in case of a skid is to steer slightly in the opposite direction from which the skid tends to head the car. As to the use of brakes, the general rule is to use them sparingly, if at all, where skidding occurs or is likely to occur, but rather to allow plenty of time and let the car speed die down gradually and to use a brake which acts on the rear wheels direct and not on the differential or propeller shaft. In the case in question, where the rear skids toward the right curb, the machine will be headed toward the left. Therefore, following the rule, the wheel should be turned to the right. The only exception to this would be in the case of a tendency for the car to move bodily to the right owing to excessive crowning of the road. In this latter case it might possibly be advisable to steer to the left to regain the crown, although even in this instance the skid will probably have altered the direction sufficiently for this purpose.

"As to the use of the brake, it is questionable whether in this instance it is wise to even throw out the clutch or slacken the speed of the motor, for it is necessary to get the machine moving in the direction of its length before it can be steered to the right to be straightened out. As soon as

the car is moving in the direction of its length and properly answering the wheel, then, of course, the clutch may be thrown out and the brake applied with judgment, if necessary. The three rules to be observed on slippery streets are: Steer small, use brakes sparingly, if at all, and either keep far enough away from the curb, so that in case of a skid the machine will not strike it, or keep as close as possible, so that in case it does strike the momentum of the car toward the curb will be small and the blow glancing."—ED.]

#### Turbine Automobiles.

Editor Horseless Age:

Has anyone ever attempted to build an automobile, gasoline or steam, with a turbine engine? If not, why not?

G. B. ROBERTSON.

[We know of only one attempt to build a steam motor car equipped with a turbine. This was a heavy truck which was equipped with a boiler, steam turbine-electric generator set and electric motors, but the regular manufacture of these trucks was never begun, although the first machine seemed to be quite successful. The reason that steam vehicles are generally fitted with reciprocating engines instead of turbines is that the reciprocating engines, if well made, are thoroughly satisfactory, and if of the compound type and designed to be operated on superheated steam they are probably more economical of steam than a turbine could be. Besides they do not require an extra speed reducing mechanism like the steam turbine.

No gasoline turbine has ever been fitted to an automobile so far as we are aware, and the reason for this is that none has ever been made that would run reliably— ED.]

#### Number of Machines in Use.

Editor Horseless Age:

I have your issue of October 13, in which you reply to my inquiry for auto statistics. I think your estimate of the number of automobiles now in use in the United States (200,000) is much too small. Let us take the State of Iowa as a basis to guess at the number of cars in this country. We have a State law requiring every owner of a motor driven vehicle to take out a license and secure a number. We now have 13,200 such machines. Our population is about 2,300,-000, which is one machine for every 175 of our population. Counting 10 per cent. of our Iowa machines out of commission or destroyed, we have one machine for every 200 people in the State. I notice in a magazine article on automobiles that the State of New York has 80,000 machines in use, which must be about one for every 100 of your population. Taking Iowa as an average State in respect to ability to buy machines, and judging from the number in use in our State, I should think there must be 350,000 motor propelled vehicles (including electrics and steamers) now in use in

the United States. Some well posted men in the business place the number of new machines likely to be made next year at 200,000, with an estimated value of \$225,000,000. I am trying to get as nearly as possible the number and value of automobiles in use in this country.

#### ROBERT FULLERTON.

[In regard to your criticism of our estimate we have this to say: The Iowa law was passed in the spring of 1907 and has now been in force three seasons. The number of the latest registration is undoubtedly far greater than the number of cars actually in commission in that State at present, because (1) some of the cars registered in 1907 were old then and have since been retired; (2) many cars have changed hands during the period since the law was adopted. some even several times, and they generally get a new number every time; (3) not only automobiles but also motorcycles are included in the list. The same argument applies to the New York figures. In New York State 82,000 cars, approximately, have been registered to date, but the registrations began in 1901, and nine out of ten cars that were registered in the early years are now out of commission. These registration figures are of no value whatever for arriving at the number of cars, except where annual registration is required.

The figure of 200,000 for the number of cars now in use is undoubtedly quite close to the truth. It is based on the annual productions and an estimated ratio of annual retirements. The figure is moreover confirmed by a statement recently issued by the Association of Licensed Automobile Manufacturers, to the effect that 305,000 gasoline vehicles had been manufactured in this country to date. Electric and steam vehicles would probably raise this figure to about 325,000, and when it is considered that actual manufacturing began about 1898 and that the average life of the earlier vehicles did not exceed five years, 200,000 seems a quite reasonable estimate of the number of cars now in commission.—Ed.]

#### Graphite or Talc?

Editor Horseless Age:

In "Hints on the Care of Tires," in your issue of the 13th inst. you in part say: "It has been recently proposed to use flake graphite to lubricate the inner surface of the cover, but we have not yet heard regarding experiments with this material for this purpose."

For more than a year I have been using and recommending the use of flake graphite. I consider it so much superior to talc that the latter does not enter into competition with it. Early in the summer I wrote to the manufacturers of the tire which I use, calling their attention to the advantages of flake graphite as a lubricant for tubes.

Flake graphite will adhere to an inner tube for at least a year, whether the tube be carried loose in the car or in use in a casing. Talc will not adhere to a tube in any considerable quantity, and will chase around

in the casing until it all collects in one place.

A lubricant that will not adhere to the parts creating the friction must be considered as something of a joke. I am inclined to believe that there is as much difference between flake graphite and talc in preventing friction, between tube and casing as there is between talc and brook sand.

WILLIAM HINDS.

# Conditions Under Which Motor Trucks Can Be Successfully Operated.

Editor Horseless Age:

Can you refer me to any copies of your paper covering the preliminary investigations necessary to determine the conditions under which motor trucks can be successfully operated? If you have published nothing relative to this, would not an article by some experienced commercial vehicle man be very much in order? H. R. S.

[Although we do not remember having had an article under the exact heading mentioned by you, we have had many articles in which the conditions which are specially favorable to the automobile, as compared with horse vehicles, were pointed out. These conditions may briefly be summarized as follows: Relatively long hauls with few stops, good pavements, importance of quick delivery, and need for enough rolling stock to make the establishment of a well equipped private repair shop possible. There may be some other conditions, but the above are all that come to mind at the moment. —Ep.]

#### Fuel Economy Record.

Editor Horseless Age:

Will you kindly give me any data concerning the largest mileage from a single gallon of gasoline in any official contest, by a gasoline car? Also advise, if possible, whether a single cylinder Cadillac ever ran 42 miles or more on one gallon of gasoline in an authentic test? R. J.

[The present record in respect to vehicle mileage on a single gallon of gasoline is held by S. G. Averell, of New York, who in the One Gallon Efficiency Contest held by the Automobile Club of Buffalo, N. Y. on July 7, 1909, drove a Franklin air cooled car weighing, with passengers, 2,948 pounds, a distance of 46.1 miles on one gallon of gasoline. A single cylinder Cadillac car weighing with load 2,325 pounds was driven a distance of 42.6 miles on one gallon of gasoline in the One Gallon Economy Contest of the New York Automobile Trade Association on May 7, 1909.—ED.]

#### Horse Power Ratings.

Editor Horseless Age:

It would be of some value, I think, if you would publish for, say, fifteen or twenty of the leading makes of touring cars the actual rating of horse power, as rated by others than the makers. I am a subscriber to your paper,

but have seen nothing of the kind; or can I purchase such information anywhere?

L. R. WASHBURN.

[You can easily determine for yourself the standard rating of any car according to the A. L. A. M. rating formula. This formula was adopted by the mechanical branch of the Association of Licensed Automobile Manufacturers, and is believed to represent very closely the output of a good average engine at a piston speed of 1,000 feet per minute. By running at a considerably higher piston speed it is possible to get more power from an engine of given cylinder dimensions, but the high speed is a disadvantage in itself. The formula is as follows: Horse power per cylinder = bore in inches squared, divided by 21/2. Thus a cylinder of 5 inch bore will develop  $5 \times 5 + 2\frac{1}{2} = 10$  horse power. The length of stroke does not enter as long as the piston speed remains the same. The bore and number of cylinders are always given in our descriptions of cars, and you can therefore easily determine the A. L. A. M. rating of any car yourself.—ED.]

## Suggested Remedy for Difficult Steering.

Editor Horseless Age:

Noting the inquiry of P. M. Sharples in your issue of October 20, regarding the hard steering of his electric vehicle as compared with gasoline automobiles he has owned, allow me to suggest to him to bend his front axle so that the distance between the bottom of his two front wheels will be at least two or even three inches less than the distance between the top of the wheels, making sure that each wheel has the same inclination, and I am sure that his electric will steer perfectly.

I had the same trouble as he is now experiencing with a tiller steered gasoline car, and experts and many specialists tried to remedy it, but all to no avail. My car was always heading for the ditch. Not until after I had driven this car 20,000 miles, always with fear and trembling, and had been ditched many times because of this trouble, did I discover that by bending the front axle, as above stated, the trouble could be overcome and absolutely corrected.

E. K. LOVELAND, M. D.

#### Detroit Show Plans.

January 24 to 29, inclusive, are the days selected by the Detroit Auto Dealers' Association for their third annual automobile show, which will be held in the Wayne Hotel Gardens. This will be the eighth annual show held in Detroit, but only the third under the auspices of the dealers' organization. For the 1910 show there is 35,-000 square feet of available floor space. All decorations will be included in the price of space. The association has voted \$10,000 to be utilized in decorating the gardens, \$2,000 more than last year. John Gillespie has been chosen general manager of the event, and has opened office at the Hotel Tuller, Detroit.

## International Convention for the Regulation of Automobile Traffic.

An international convention, called by the French Government at the suggestion of the Homburg Conference of the International Recognized Automobile Clubs, met at the Palais of the Minister of Foreign Affairs in Paris on October 5, with the object of arriving at an agreement regarding the control of international automobile traffic. The following eighteen countries were represented: France, Germany, Austria, Hungary, Belgium, England, Italy, Russia, Holland, Spain, Portugal, Roumania, Switzerland, Servia, Montenegro, Monaco, Sweden, Bulgaria and the United States (by W. S. Hogan).

M. Gavarry, one of the French delegates, was elected president of the convention. After a brief discussion it was decided to hold the sessions in star chamber. Two committees were appointed, one for the purpose of studying all technical questions relating to automobiles and their drivers, of which the Belgiam delegate, Lagasse de Locht, was named chairman, and the other for the purpose of studying international traffic and customs proceedings, of which the German delegate, Baron Lancken, was named chairman.

During the second session, on October 6, there was a lively discussion regarding the requirements to be made of automobile drivers. The French Government made the following proposition: No one shall be allowed to drive an automobile without having first procured a permit, which will be issued to him by the competent authorities after he has demonstrated his competency. The permit is not to be issued to persons under eighteen years of age. In the determination of the applicant's competency the following rules must be observed: The applicant must be able to steer perfectly; he must have an intimate knowledge of the parts of the car and their functions. If the applicant is recognized competent, he will be given a driver's license from the competent authority. The German Government proposed the following amendment through Baron Lancken: "The driver must also possess the physical and intellectual qualities to enable him to drive calmly and collectedly in crowded streets and under the most difficult circumstances: he must have perfect eyesight and hearing, and must possess the moral qualities which insure sufficient guarantees to the public."

On October 7 the convention held its third meeting, at which it occupied itself with customs formalities. The following "The passage resolution was adopted: from one country into another can be permitted only to automobiles which carry in the rear, clearly discernible, a distinguishing mark of the country in which the car is registered. As concerns warning signals, the horn is the only device permitted, and every car must be provided with one. However, outside of built-up districts the use of other signaling devices will be permitted which are in accordance with the regulations and customs of the respective countries. Every car must be equipped with two lamps in front and one in the rear. The road ahead of the car must be illuminated for a sufficient distance, but the use of dazzling headlights in cities is prohibited. Motorcycles need only carry one lamp, which must be attached to the front."

The fourth session was occupied with a discussion on an agreement regarding auto traffic rules. It was resolved that auto drivers in meeting or overtaking other vehicles must always strictly comply with the customs of the district in which they are driving. Every one of the subscribing countries engages itself to see that for the designation of dangerous points along the roads only danger signals are erected which carry the marks agreed upon by the recognized automobile clubs. This system of road signs should be completed by a further sign indicating the proximity of a customs station, and a required stop. This sign might be in the form of a round white disc.

The governments of the different countries furthermore agree to observe the following regulations: I. It is in general unnecessary to indicate road obstructions in built-up districts by warning signs. 2. The signs should be erected at a distance of 250 yards ahead of the obstruction, etc., unless local conditions do not admit of this. If the distance of the sign from the obstruction is considerably more or less than 250 yards, special arrangements must be made. 3. The warning signs must be erected perpendicularly to the road.

#### **Business Troubles.**

The first meeting of the creditors of the American Automobile Engine Company, of Jamaica Plain, Mass., which was petitioned into involuntary bankruptcy in September last, was held on October 22. Schedules filed disclosed an indebtedness of \$142,726.08 and assets of \$42,241.15. The largest unsecured creditors are the International Trust Company, \$2,254.64; Whipple, Sears & Ogden, \$2,456.87, and F. J. Hall, \$6,799.11. Edward N. Golding was elected trustee, his bond being fixed at \$4,000. Mr. Golding reported to the court that it would be to the best interests of the creditors to sell the plant at Jamaica Plain, which is estimated to be worth about \$30,000.

The petition in bankruptcy against Walter G. Pierson, dealer in auto supplies, 43 Cortlandt street, New York, has been dissolved. Mr. Pierson denied that he was insolvent or had committed the acts of bankruptcy alleged in the petition.

The first motor car factory in Russia has just been started in connection with the Russo-Baltic Engineering Works, in Riga.

There are now 843 registered cars in Calcutta, 661 in Bombay, about 160 in Madras, with smaller numbers in other cities. French and English makes dominate the market in India.

#### The New York-Atlanta Good Roads Tour.

the thirty-eight competing cars being penalized. The running time for cars in Class

Monday morning, the 25th, promptly 45, 62 cars started from the Herald ing in this city, on the New York Id-Atlanta Journal Good Roads Tour, will end on November 3, at the office e Atlanta Journal, Atlanta, Ga. The Id entry list is given in the accomng table.

start was made under the superof the police department, and was le for the absence of confusion. The were drawn up in a double line around Herald Building in the order of their I numbers, the line extending along Sixth avenue side of the building d through Thirty-sixth street. The d cars were backed up to the curb in of the entrance to the building on v-fifth street. At the starting shot the I cars moved out and down Broadway order in which they were arranged, vere followed by the contestants, withany confusion whatever. The cars ipating were escorted down Broadway Battery by 75 cars, representing the York Automobile Trades Association, cars in the tour were taken across taten Island Ferry to St. George on ferryboats and then proceeded along Staten Island shore road to Perth by, escorted by members of the Rich-County A. C. The ferrying of the from Perth Amboy to Tottenville red several trips of the boat. Before g Tottenville a one hour's stop for was made at the Packer House. alf past I the run was continued e Quaker City. The drive through pleasant country, resplendent in its an dress, was enjoyed by all, and the day's run was completed without und incident.

leaders of the tour reached Philhia about 4 o'clock. The first car to was a Rainier, driven by Mrs. J. N. o, of New York. Mrs. Cuneo was panied by her husband, Mrs. Dis-F. Ed. Spooner and L. D. Disbrow. tourists were met at the city limits White steamer, driven by Stewart who piloted them to their stopping the Hotel Walton. Much interest aken in the cars along Philadelphia's row. The second arrival was the ners-Detroit Bluebird, driven by the all crack Ty Cobb, and occupied beby M. C. Reeves and E. Anderson. cars were parked during the night

e City Hall courtyard, where they under police guard. The Quaker Motor Club kept open house all event their rooms, on the second floor of fotel Walton, and the visitors were an impromptu reception, the club is welcoming the guests and wishing a safe journey for the rest of their

e second day's run, from Philadelphia ttysburg, a distance of 120 miles, also d a very successful one, only one of

Chalmers-Detroit Mitchell Rainier Alco Stearns Craig Chalmers-Detroit Locomobile	A. L. Westgard, New York. Frank X. Zirbies, Racine, Wis. Mrs. John Newton Cunco, New York. American Locomotive Co., New York. Wyckoff, Chuch & Partridge, New York. Ajax-Grieb Rubber Co., New York. Tyrus Raymond Cohb, Detroit, Mich. Mildred B. Schwalbach, New York.	Road judges' car, Pacemaker's car, Press car. Official car. Official car. Tire car, Checker's car.
Carman	Commercial Williams Management on Cane	
No. Make.	Entrant.	Address. Class.
1-White	John W. Grant	Atlanta, Ga 2
2-White	Board of Trade, Commerce, GaC. J.	Commerce Ga 4
I_Stavens Durves	Edward H Inman	Atlanta, Ga 8
4—Thomas	Colonel John J. Woodside	Atlanta, Garanna 1
5-White	Chamber of Commerce, Anderson, Ga	
6 Starona Duruan	Entrant.  John W. Grant.  John W. Grant.  Hood Hood Hood Edward H. Inman Colonel John J. Woodside Chamber of Commerce, Anderson, Ga.— Dr. W. E. Atkinson Colonel William L. Peel Moultrie (Ga.) Board of Trade—W. E. Aycock F. D. Hughes Mrs. Elizabeth de Giers Spartanburg (S. C.) Chamber of Commerce—J. T. Harris  Alfred Austell City of Salisbury, N. C.—C. W. Smith Atlanta Auto Association—Asa G. Candler, Jr., president Board of Trade, Winston-Salem, N. C.— F. S. Vernay, president Forrest Adair William Oldknow L. Lee Barnes Automobile and commercial associations —J. H. Ham W. J. Stoddard	Atlanta, Ga
7—White	Moultrie (Ga.) Board of Trade-W. E.	Atlanta, Garrente 4
	Aycock	Moultrie, Ga 4
8-Chalmers-Detroit	F. D. Hughes	New York city 4
10—Ruick	Sportsphurg (S. C.) Chamber of Com-	New York city
10-Duick	merce—I. T. Harris	Spartanburg, S. C
11-Apperson	Alfred Austell	Atlanta, Ga 2
12—Overland	City of Salisbury, N. C C. W. Smith	Salisbury, N. C 1
13-rope-roledo	Atlanta Auto Association—Asa G. Cand-	Adams Co
14-Studebaker	Board of Trade, Winston-Salem, N. C	Atlanta, Ga
	F. S. Vernay, president	Winston-Salem, N. C., 4
15 Stevens-Duryea	Forrest Adair	Atlanta, Ga 8
17—Thomas	Lee Rarnes	Atlanta, Ga 1
18-Maxwell	Automobile and commercial associations	Atlanta, Garristini +
10 Carlotator	—J. Н. Нат	Charlotte, N. C 5
90 Premier	W. J. Stoddard	Atlanta, Ga 5
21—Jackson	lacones Futrelle	Scituate Mass
22-Oldsmobile	Henry J. Lamar, Jr	Macon, Ga 1
23—Thomas Flyer	Charles I. Ryan	Atlanta, Ga 1
25—Pennsylvania	Colonel James W. English, Jr	Atlanta, Ga
26-Maxwell	Maxwell-Briscoe Motor Company	Tarrytown, N. Y 4
27-Maxwell Toy Tonneau.	Maxwell-Briscoe Motor Company	Tarrytown, N. Y 4
28-Maxwell Kunabout	Maxwell-Briscoe Motor Company	Tarrytown, N. Y 6
30—Renault	Renault Frères Selling Agency	New York city
31—Reo	R. M. Owen & Co	New York city 5
32—Buick	W. L. Brown	Lawrenceville, Ga 5
34—Knox	W A Kelly	New York city 2
35-Matheson	Matheson Automobile Company	New York city
36-Pullman	York Motor Car Company	York, Pa 4
37—Pullman	York Motor Car Company	York, Pa 4
39—Selden	Evelyn Harris	Atlanta, Ga
40-Metz Runabout	Metz Company	Waltham, Mass 6
41-Metz Runabout	Metz Company	Waltham, Mass 6
42—Regal	Read Holliday	New York city
44—Benz	Chamber of Commerce	Atlanta, Ga 1
45-Chalmers-Detroit	Carl H. Page	New York city 3
45—Oldsmobile	Locard Restratev	Miami, Fla
48-White Steamer	Walter C. White.	New York city 2
49-Apperson Jack Rabbit	Automobile Blue Book Publishing Co	New York city 1
50-Franklin	George H. Storck	Jacksonville, Fla 4
59—Corbin	Chamber of Commerce	Roanoke, Va 8
53—Oldsmobile	Frederick Weis	Brooklyn, N. Y 3
54—Franklin	Nilham Ordknow. I. Lee Barnes. Automobile and commercial associations —J. H. Ham. W. J. Stoddard. Gity of Charlotte, N. C.—A. Burwell, Jr. Iacques Futrelle. Henry J. Lamar, Jr. Charles I. Ryan. Colonel James W. English, Jr. Pennsylvania Sales Agency. Maxwell-Briscoe Motor Company. Maxwell-Briscoe Motor Company. Maxwell-Briscoe Motor Company. White Star Auto Company. White Star Auto Company. Renault Frees Selling Agency. R. M. Owen & Co. W. L. Brown. S. W. Hanson. W. A. Kelly. Matheson Automobile Company. York Motor Car Company. York Motor Car Company. Metz	Greenville, S. G 2

OFFICIAL CARS (Non-Contesting).



THE CARS ARRIVING IN HERALD SQUARE.



GETTING READY FOR THE START.

1 was 7h. 40m. The start from Philadelphia was made at 8 o'clock, and the first part of the day's run led over the most perfect of highways through the wealthy suburban towns of the Quaker City, which were oil-treated for the most part. But after Exeter, Pa., had been passed the good roads were left behind, and ordinary dirt country roads, quite hilly and with numerous water breaks were encountered. The only car to meet with serious trouble during the day was the Pope-Toledo entered by the Chamber of Commerce of Lynchburg, Va., driven by Carter Glass. Owing to some defect in the mechanism the driver was forced to return to Philadelphia and withdraw from the contest. The Knox car, driven by Joseph W. Jones, and which carried the referee of the contest, Winthrop E. Scarritt, broke a spring 20 miles northeast of York, Pa., and Mr. Scarritt was obliged to take passage on the Reo, driven by R. M. Owen, of New York, in which he completed the day's tour. After several hours effort Mr. Jones' party succeeded in finding a blacksmith who repaired the spring and the car was able to reach its destination.

The stop for lunch was made at York, Pa., which point was reached shortly after noon. During the afternoon considerable stretches of bad roads were encountered, and the contestants got their first taste of the difficulties in store for them. As on the first day, many of the contestants showed a disposition to drive at high speed, and Referee Scarritt was obliged to issue a warning to the effect that racing must not be indulged in. Late Tuesday evening Mr. Scarritt issued the following official bulletin:

"The second day's run of the New York Herald-Atlanta Journal good roads tour was completed about 4 o'clock this afternoon. Out of the thirty-eight entries checked out from Philadelphia thirty-seven reported at the night control. This is a splendid showing.

"By special arrangement provision was made for the contestants and their guests to drive over the historic battlefield of Gettysburg. This was a never to be forgotten pleasure, for which we are indebted to the courtesy, thoughtfulness and hospitality of the two great newspapers conducting the tour, and this crowned the end of a day of unmixed delight.

"One driver was warned for what was doubtless a thoughtless violation of the rules of the road. In this connection the referee calls attention to the rule in regard to too rapid driving, and warns contestants that reckless driving will not be tolerated. We now are approaching a part of the country where motor cars are much less frequently seen than in the

more populous centres. Greater care and caution, therefore, should be exercised, especially in passing through villages and towns and along narrow country roads, where one meets horses unaccustomed to the sight and sound of motor cars. In such circumstances contestants are asked not to drive at speed or to run with mufflers of their cars cut out. Let it be our fixed purpose to do unto the other users of the common highway as we would have them do unto us under reversed conditions."

The itinerary is as follows: First day, New York to Philadelphia, 99 miles; second day, Philadelphia to Gettysburg, 120 miles; third day, Gettysburg to Staunton, Va., 179.9 miles; fourth day, Staunton to Roanoke, Va., 92 miles; fifth day, Roanoke to Winston-Salem, N. C., 125.8 miles; sixth day, Winston-Salem to Charlotte, N. C., 137.6 miles; seventh day, Sunday, spent in Charlotte, N. C.; eighth day, Charlotte, N. C., to Greenville, S. C., 10 Commerce, Ga., 109.8 miles; tenth day, Commerce to Atlanta, Ga., 81.5 miles.

The classification of cars is as follows:

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**	3					ķ	ě	٠	ķ	k	×	ě	۷.		.,	ø	,		ķ	×	ě	×	ķ	ķ	2,00	I	to	3,000	
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	5		ė		A	a	×	×	×	×	×	×	69	k	4.5	ŧ,	4	ĸ,	×	8	×	×	s	c	85	E	to	1,250	
77	6			٠		٠	٠	ı					2								۰		۰		80	o	and	under	

The rules governing the contest may be briefly summarized as follows: Stock cars only may compete. Touring cars must carry four or more persons, or the equivalent in dead weight ballast, at the rate of 125 pounds per person; runabouts, two or more persons, or the equivalent; miniature tonneau cars, four or more persons, or the equivalent. Each competing car must be examined by the technical committee. No car shall pass the pacemaker. Contestant may carry as many tires and tire accessories as desired or purchase same en route, and no



WAITING AT THE FERRY TO STATEN ISLAND.

penalty shall be imposed for tire repairs, but time so lost must be made up. Frames and engine castings are to be sealed before the start, and any replacement of these parts shall result in disqualification. Customary rules regarding checking in and out at controls are to be observed. Time penalization is to be as follows: After an allowance of two minutes, each late arrival shall be penalized one point for each minute or part thereof. Trophies aggregating in value at least \$1,700 are to be awarded to the winners in the different classes, and a suitable trophy is to be awarded to the private owner having the least points to his debit, provided he has not won a class trophy.

Winthrop E. Scarritt, of New York, is referee of the contest; Frank X. Zirbies, of Wisconsin, pacemaker; E. L. Ferguson, of Buffalo, starter; Mortimer Reeves, of New York, and Inman Gray, of Atlanta, are checkers.

Vanderbilt Cup News.

Practice on the course has been going on all through the past week, and speeds better than a mile a minute were made. The technical committee opened its head-quarters at Monk's store, near the railroad station in Garden City, for the purpose of making an examination of such cars as were ready, and the drivers and managers of racing cars were requested to immediately notify A. L. McMurtry, the chairman of the technical committee, where they could be found.

The drawing for positions in the race will be held at the Garden City Hotel at 8:30 o'clock on Thursday evening. As in previous years, there will be two drawings—the first to indicate the order of drawing, and the second drawing for the order of start in each class. It is important that all the drivers and managers of the cars entered in the races attend this meeting, as the referee and Starter Wagner will issue their final instructions to the racing crews at this time.

In this connection it might be stated that little time will be lost in starting the cars, as, owing to the short circuit this year (1264 miles), it will be necessary to send



CARS LINED UP AT PERTH AMBOY FERRY.

the cars away at 10 or 15 second intervals instead of a minute apart as in former years. The Long Island Railroad announce that they will run special trains from East Thirty-fourth street and Flatbush avenue at frequent intervals between 4:30 and 8 a. m. on October 30, the day of the race. Some of these specials will run to Westbury and Hicksville, others will run direct to the grand stand as follows: East Thirty-fourth street at 6:50 a, m., 7:10 a. m. (all parlor cars) and 7:30 a. m. Flatbush avenue at 7:30 a. m., stopping at Nostrand avenue and East New York. A special excursion fare of \$1.25 will be charged on these trains. Among the new entries are a Columbia and a big Atlas, two cycle, four cylinder car.

The Bosch Magneto Company offer the following prizes to the winners if equipped with their magnetos: To the winner of the Vanderbilt Cup, \$250; to the winner of the second prize, \$150; to the winner of the third prize, \$100. The company will have two experts on the course during the race, with a complete line of extra parts and ready to assist on all cars equipped with their magnetos.

Following their custom, the officials of the Maxwell-Briscoe Motor Company have leased a tract of land opposite the grand stand, for the free and exclusive use of owners of Maxwell cars who desire to view the race. The ground furnishes ample room for over 500 cars.

The following is the complete list of entries for the three events:

VANDERBILT	CUP RACE.
Make of Car.	Driver,
Simplex	L. A. Mitchell.
Isotta-Fraschini	Joe Seymour.
Chalmers-Detroit 40	Bert Dingley.
Chalmers-Detroit 40	L. B. Lorimer.
Fiat	Lewis Strang.
Alco	Harry F. Grant.
National	John D. Aitken.
National	Chas, C. Merz.
Apperson Jack Rabbit	Hugh N. Harding.
American Roadster	
Buick	
Fiat	
Fiat	E. H. Parker.
Marmon	
Atlas	
Mercedes	Spencer E. Wishart.

	WHEATLEY	HILLS	SWEEPST	AKES.
Make o				ver.
Moon			Philip	Wells,
Marion .			Geo. L	. Reiss.
Marmon	********		R. W.	Harroun
Columbia	********		R. W.	Wilcox.
	The second	-		

	MASSAPEQU	A SWEEPSTA	KES.
Make of	Car.	D	river.
Chalmers-I	Detroit 30	Wm.	Knipper.
Chalmers-I	Detroit 30.	Joe 1	Matson.
Hudson 2	0		Ainslie.
Maxwell .		Marti	n Dooly.
Maxwell .		Thom	as Costell
Manuall		Author	a C.a.

The Carl H. Page Company, New York agents for the Chalmers-Detroit car, have



THE MITCHELL PACEMAKER.



R. M. OWEN, DRIVING THE NEW MODEL 1910 FOUR CYLINDER REO ROADSTER.

secured parking space at the side of the track opposite the grand stand and issued an invitation to all owners of Chalmers cars to make use of it.

The best time in practice so far was made by Bert Dingley in one of the Chalmers Bluebirds, on Tuesday, viz.: 11 minutes flat. A number of accidents have also occurred due to skidding, but none very serious. The Moon car, driven by Phillip Wells, crashed through a wire fence and turned turtle, and may not be able to compete, as all four wheels were smashed and the frame bent. The mechanic was injured, but the driver jumped and escaped harm. It is as yet uncertain whether repairs can be made in time for starting the car in the race.

While the entry list has been nominally closed the management still expect several additional entries, but will not announce the cars until the checks for the entry fees have been received.

#### The Atlas Entry for the Vanderbilt Cup Race.

The car which the Atlas Motor Car Company have entered for the Vanderbilt Cup Race is the first two cycle car which has ever taken part in a long distance road race. The car is claimed to be capable of a speed of from 75 to 80 m. p. h., which is said to be made possible by improvements in the two cycle motor, enabling it to run at an extraordinarily high piston speed. The motor is a four cylinder one of 5 inch bore and stroke each, the bore and stroke being 1/2 inch more than in previous Atlas models. This motor is said to develop 60 horse power, at 1,200 r. p. m. The car belongs to Class 2, having a piston displacement of only 393 cubic inches, as against the limit of 600 cubic inches for cars in Class I. The car is a new model that will be sold by the Atlas Motor Car Company next season, equipped with either a seven passenger touring car body or a baby tonneau body. The body is of aluminum and is mounted on a drop frame. The wheels are 36 inches in diameter.

#### Test of the Atlanta Speedway.

A trial of the two mile speedway at Atlanta, Ga., was made on Saturday of last week, in the presence of several thousand spectators, who paid 50 cents each to get into the enclosure. Some of the most noted drivers in the country took part in the trial, for which an official sanction was issued by the A. A. A. The cars were started by Fred J. Wagner. Those who went specially to Atlanta to participate in the test were Barney Oldfield, who drove a Benz racer, George H. Robertson, driving a Simplex, Basle in a Renault and Kirscher in a Darracq. Besides these, Asa G. Candler, Jr.'s Pope-Toledo car was tried out on the course by Cliquot. The races, which started at 2 o'clock, proved the track to be one of the fastest that has ever been built, although it was still slippery in spots from freshly applied oil. The best time was made by Barney Oldfield, who drove five miles in 3.52 3-5. The results of the day are summarized as follows:

Three Cornered Race, 10 Miles: Robertson, Simplex, won, 8:21.2; Cliquot, Pope-Toledo, second, 8:34.2; Basic, small Renault, third, 10:13.2. Amateur Driving: Ed Durant, of Atlanta, Renault, 5 miles in 5:08; champion amateur driver

of the State,

One Two Three Four Five Six Mile. Miles. Miles. Barney Oldfield, Benz..... 2:21.3 1:31 \*\*\* 3:03 3153.3 4:34.2 George Robertson, Simplex .... 1:34.3 2154.4 Cliquot, Pope-Toledo..... 3:38,2 1:36 2:45.2 4:34-3 5:21.4 Kirschner, Darracq..... 0:53 3:58 Basle, Renault.... 4:34

According to the recently published customs returns of the Swiss Government for the first half of 1909, the importation of automobiles and motorcycles increased by 25 per cent. over the same period last year, and attained a value of 1,586,146 francs. The exports of Swiss automo-

The Automobile Club of Buffalo, N. Y., has arranged for a series of lectures by technical experts at the clubrooms during the coming winter.

biles increased by 50 per cent., and ag-

gregated 2,932,200 francs in value.



THE ATLAS RACER.

# Garage Items

#### Split in Denver Trade.

Unwillingness to support the local show planned by the Denver Motor Club for March next has led to the organization of the Denver Automobile Dealers' Association with the following officers: F. L. MacFarland, president; E. Linn Mathewson, vice president; L. R. Stone, secretary, and E. E. Zook, treasurer. Tom Botterill, J. H. McDuffee and W. W. Barnett were chosen as an executive committee to act with other officials, who serve for one year.

The new organization at once passed a resolution not to take part in any show this year. It seems that the dealers took offense at not being consulted by the Denver Motor Club regarding the arrangements for its show, and that they are opposed particularly to the date set for it, in March, when, they say, people begin to think about 1911 models, and know all about those of 1910, which would be the only ones available for exhibition.

#### Co-operative Garage Trust Scheme.

In our last issue we announced the incorporation of the Buick Auto Supply & Garage Company of Saginaw, Mich., under the laws of the State of Maine. The company derives its name from Thomas D. Buick, who formerly conducted an automobile supply business in Flint, Mich. According to prospectuses sent out by the new company, it plans the establishment of a network of garages and supply stores in all the printipal cities of the country, on the co-operative plan; that is to say, it expects to raise the capital for the local companies among the automobile owners who will be the customers of these companies. It stated that subsidiary organizations have been practically completed under the direction of the parent company in Michigan, Indiana, Ohio and Illinois.

The Utah Retail Automobile Dealers' Association was organized at a meeting held at the Commercial Club in Salt Lake City, on October 12. One of the chief objects of the organization is to conduct an automobile show in the Auditorium in February next. Most of the local dealers were represented at the meeting, and steps for permanent organization were taken. The following officers were elected: Fred Raymond, president; Frank Botterril, vice president, and Roger W. Powers, secretary and treasurer.

# Commercial Applications

## An Auto Transportation Service in Porto Rico.

C. H. Martin, of New York, has just returned from San Juan, Porto Rico, where he organized and established the service of the Porto Rico Auto Transportation Company. The latter concern does a passenger transportation business between San Juan and the residential suburb, Santurce, with four 30-passenger motor buses. The service is conducted in direct competition with a trolley service. One of the factors which gives the motor transportation company a considerable advantage is that the trolley line has only a single track, and its cars are delayed a great deal on switches, which enables the motor transportation company to save its patrons from 15 to 20 minutes of time on the five-mile trip. The fare charged is five cents. The service was started on July I last.

The cars were built after Mr. Martin's designs at the shops of the American Motor Truck Company in Lockport, N. Y. The buses are equipped with four-cylinder, 51/4 by 6 inch Herschell-Spellman motors, and a massive planetary change speed gear. The front wheels are equipped with 5-inch single solid tires, and the rear wheels with 4-inch dual tires. The tires, by the way, have been the only parts to give trouble so far. They began to creep on the rims, and this has been the only cause for withdrawing cars from service for short periods. Aside from these short delays, the cars have been kept in service for 24 hours a day. The seating capacity of each bus is 30 passengers, but as many as 47 have been carried on one vehicle during rush hours. The company runs its vehicles over a single line, which parallels the trolley line, and cars are run at 15 minute intervals. Native drivers are employed, and in addition to the driver a conductor accompanies each

One of the special requirements in a vehicle for service in that locality is an extremely large radiator. The district is quite hilly, numerous stops are required, the buses naturally must be run at a relatively slow speed, and the climate is hot, so that the necessity of providing large cooling capacity is easily explained. The radiators of these buses are supported on trunnions by means of spring supports and are held in their vertical position by hose connections. The axles of the vehicles are of Timken construction.

# To Furnish Autos Under a Service Contract.

The Auto Contract Company has been organized at New York for doing a general auto renting business under contract for terms from one month up, and has established headquarters at 26 East Twenty-

eighth street. The company will furnish both gasoline and electric vehicles for either pleasure driving or commercial purposes. The charge for electrics for pleasure driving will be from \$300 per month up, that for gasoline vehicles for the same purpose from \$450 per month up, and that for commercial vehicles from \$350 per month up. The company will guarantee to keep the cars in perfect condition and will have drivers on call at any time in the case of pleasure cars and for ten hours a day in the case of commercial vehicles.

#### Commercial Applications.

The C. K. Taxicab Company is being organized in Cincinnati, Ohio., with a capital stock of \$200,000, and it is planned to begin operation with 20 cabs, and to increase the equipment to 50 by the first of the year. The rates will be 30 cents for the first half mile and 10 cents for each additional quarter mile.

The city officials of Pittsburg, Pa., are planning to "motorize" the equipment of the downtown fire engine houses. Chief Engineer Miles F. Humphreys, of the Pittsburg department, is said to be very favorably inclined toward motor propulsion. The first changes are to be made at engine houses No. 19 in Water street, and No. 3 on Seventh avenue.

The City Council of Los Angeles, Cal., may decide upon the use of one particular make of machine in the city departments in the future. A committee have been appointed to investigate the merits of all machines offered to the city, and to make a report to the council on the machine they consider the best for all the various municipal uses. One of the first purchases will be an automobile for the health department.

Fire Chief W. B. Cummings, of Atlanta, Ga., is opposed to any further purchase of horse drawn vehicles for his department. He has witnessed the performance of motor propelled fire engines, hose wagons and trucks, and considers them a great deal cheaper and more effective than the old style apparatus. Chief Cummings will endeavor to have all of the suburban stations equipped with the new kind of apparatus.

The Baker Electric Vehicle Company has recently furnished an electric delivery wagon for use in handling baggage for the executive office of the White House. The car was made on a special order for the Government. It has a 42 cell, 9 P. V. Exide battery, a wheel base of 85 inches and 34x3 inch solid rubber tires. The body was specially designed and built by the Brown Auto & Carriage Company. The car is capable of carrying a load of 1,000 pounds.

#### Business Opportunities.

The city of Lockport, N. Y., has decided to purchase a motor propelled hook and ladder truck. All communications regarding this matter should be addressed to W. M. Trevor, 165 Pine street.

#### New Record in Portola Race.

Jack Fleming, driver of the Pope-Hartford car, won the chief event in the Portola race at Oakland, Cal., on October 23. The distance was approximately 258 miles, and was covered by Fleming in 3h. 58m. 15s., at an actual average speed of 64.51 miles per hour. This is a new record, breaking the world's record established at Santa Monica, Cal., of 64.44 m. p. h., and that of the Vanderbilt Cup race of 64.42 m. p. h.

The race was held over a 21 mile circuit which was covered 12 times. Two cars were within two laps of the winner at the finish, namely, the Apperson, No. 13, driven by Harris Hanshue, and the Lozier, No. 12, driven by Harry Michner. The Apperson made fine spurts toward the last in trying to overtake the Pope-Hartford, but did not succeed in doing so. It led the Lozier, No. 12, by almost a lap at the finish.

The Apperson car, driven by Hanshue, won the second race, covering the 210 miles in 3h. 12m. 33s., and the Lozier secured second place in this race. The first race, consisting of seven laps, was won by the Pope-Hartford. Fleming also made by far the best time in the second race, but as he was not entered in this event it did not count. It was in the final event, the free for all over a course of 258 miles, in which the Pope-Hartford scored its triumph.

The race was marred by a number of accidents, at least one of which proved fatal. The Knox, No. 11, driven by Frank Free, left the course near San Leandro, and killed a spectator. Free and his mechanic, Joe Robinson, were thrown out and badly bruised. When the Sunset car rounded a turn, a metal tire retaining ring flew off into the crowd, fracturing the skull of a man named McKittrick. The Chalmers-Detroit, No. 7, struck a fence near San Leandro and turned turtle, but no one was injured in the accident.

#### Scarcity of Labor in Indianapolis.

Automobile factories in Indiana are confronted with an inability to get sufficient workmen for their plants. All Indiana industries are now working full time, while the automobile factories are practically all working overtime on 1910 cars. Although wages have been advanced, men cannot be found to fill waiting positions. The State statistician, J. L. Peetz, is conducting a free State employment bureau in Indianapolis and has received a request for 500 men from the Maxwell-Briscoe Motor Company, which has a plant at Newcastle. Probably 100 men experienced in automobile work could get positions in Indiana factories, it is said.

F. H. Sims has been named assistant secretary of the Columbus (Ohio) Automobile Club to succeed Mr. McIntire, who was compelled to relinquish the office because of a press of other business.



# A Fire Insurance Policy Does Not Cover Damage by a Collision Followed by a Fire.

A judicial decision in an insurance case which ought to be of considerable interest to all automobile owners has just been given in Fall River, Mass. The suit was brought by L. Clifford Bodge, of that city, against the Automobile Mutual Insurance Company of America. In June last Mr. Bodge's automobile, at a curve in the road at the approach to the Cole's River bridge in Swansea, Mass., left the road and collided with a tree. The car turned a complete somersault, caught fire and was completely destroyed so far as any further use was concerned. At the time of the accident the car was in charge of an employee of the Flint Motor Company, of Providence, at whose shop it had been overhauled and repaired. The driver and a companion were both thrown out and injured, but not seriously. Mr. Bodge had bought the car, a 30 horse power touring car of well known American make, from a former owner, and took over from him a \$3,800 fire insurance policy on the car in the Automobile Mutual Insurance Company of America, located in Providence, the policy having been taken out when the car was new. The owner of the car claimed practically total loss, and made claim for \$2,750. The insurance company, on the other hand, claimed that the greater damage was done by the collision, and offered \$1,000 in settlement, which was refused. A clause in the policy provided that in case of difference over a claim appraisers should be appointed, and this was done. The appraisers have just made a report recommending an award of \$810. Mr. Bodge, the complainant, has not yet decided whether to accept the award, as he also has an action pending against the Flint Motor Company in an endeavor to make them responsible for his loss, as he claims that the car was still in charge of the company when the accident occurred.

#### Revising Denver's Auto Regulations.

A committee from the Denver Motor Club, headed by President Ralph Smith, held several conferences with the fire and police boards for the purpose of drawing up a new ordinance code which will make the automobile laws and regulations uniform. The committee claims that the present code is inadequate. The attention of the boards was called to the trafficking of numbers, particularly by garage owners, who do not report the transaction, thus baffling the police in cases of accident. The committee also recommended that professional drivers of automobiles be examined by a board, to be created for that purpose, and that without a certificate from such

board a license should not be granted. A charge sufficient to cover the expenses of these examinations will be made. Taxicabs and their fares will be regulated, and a license fee will be imposed on all garages. The existing rules covering the display of numbers on the front and rear of machines are to be enforced with increased rigor.

#### Failure to Have Lamps Lighted as Required by Ordinance is Negligence.

Under an ordinance making it unlawful to operate an automobile in the city between one-half hour after sunset and one-half hour before sunrise, without the proper lights, describing them, it was held that the failure to have lights, where a pedestrian was struck, was negligence. The court instructed that this established negligence, and it was not necessary for the plaintiff to make any further showing of negligence in order to recover. It was held that the omission to perform the duty required by statute "should contribute directly to the injury," otherwise no action for damages could be maintained. It was further held that the subsequent instruction set this forth, and, as a whole, the instructions were right. Judgment for plaintiff. Fenn vs. Clark, 103 Pac. 944 (California.)

#### Ohio Law Upheld.

The Ohio Supreme Court, in a decision handed down last week, upheld the constitutionality of the Ohio automobile law The constitutionality of the statute was attacked by T. M. Drolesbaugh, of Crawford county, when he was arrested for driving his car without registering it. He pleaded the arbitary discrimination of the law against auto vehicles in favor of horse drawn vehicles, and asked that the law be declared unconstitutional. He said it violated Art. I of Sec. 2 of the Ohio constitution. The decisions of the lower court, which were against the plaintiff, were upheld.

# Enacting State Law as City Ordinances in Wisconsin.

The recent decision of a Wisconsin court that the State law regulating automobiles supersedes any city ordinance to the same effect has led the common councils in a number of cities to adopt the State law as a city ordinance. This procedure permits the city attorney to conduct prosecutions, the resulting fines, if any, going into the city treasury. While the district attorney was the proper prosecutor, fines went into the State Treasury, in cases where the State law and city ordinance were at variance. The State law permits of a speed of 12 miles an hour in cities, and 25 miles in the country.

#### Legal Notes.

The Board of Aldermen, of the City of New York, on October 19, passed an ordinance appointing a number of taxicab inspectors, but did not provide any funds for meeting the cost of inspecting the cabs.

The city council of Chicago has adopted and Mayor Busse has signed an ordinance which prohibits the establishment of a public garage within 200 feet of a school or hospital. The ordinance was adopted with the immediate object of preventing the erection of a public garage near the Graeme-Stewart School.

The Ohio State Automobile Department has issued orders to police departments to see that all number plates are clean and legible at all times, or to arrest the driver. It is the intention also to put a stop to the practice of some owners of taking a hammer and battering the tags in order to make them illegible.

Dr. J. J. Kindred, superintendent of the Astoria Sanitarium, was rebuked by Magistrate Herrman in the Morrisania (N. Y.) Court last week for having driven at a speed of 25 miles an hour on Pelham Parkway. The doctor explained that it was absolutely necessary to get a patient to the hospital as soon as possible, but his chaufeur was held for trial.

The Massachusetts Highway Commission has withheld its approval of the special automobile speed ordinance passed by the selectmen of the town of Yarmouth. The commission is of the opinion that the State law recently enacted should be given a fair and reasonable trial, and no special regulations should be made by municipal authorities and approval by the board except under unusual circumstances.

The Florida Legislature has just passed an automobile law which does not establish a definite speed limit, but requires automobiles to be driven at a speed that is "reasonable and proper, with due regard to the use and traffic of the highways." All cars must be registered, and a fee of \$2 is exacted for the registration. Chauffeurs must also register. Non-residents registered in other States are exempt for thirty days.

Columbus, Ohio, Show Dates Set. The Columbus (Ohio) A. C. will hold a motor show in the Columbus Auditorium for eight days, excluding Sundays, beginning December 25. At a recent meeting of the club the date was decided on after consultation with Sidney Black, of Cincinnati. The hall has a larger floor space than any similar structure in Ohio. A committee consisting of Perin B. Monypeny, Herman Hoster, N. O. Aeby, Fred H. Caley and D. Kelly has been named to arrange the details. A general admission of 50 cents will be charged. Excursions will be run on all railroads and interurban lines entering Columbus.

The Toledo Motor Car Company, which is controlled by the Overland Automobile Company, has petitioned the municipal authorities of Toledo, Ohio, to vacate certain streets and alleys. The company owns all the surrounding property and plans to erect additional buildings.



The new State highway around Jacob's Ladder, in the town of Becket, Mass., is now open for traffic.

The Bartholomew Company, of Peoria, Ill., have begun the manufacture of cars in their new factory on Prospect Heights,

The Maumee Rubber Company, of Toledo, Ohio, have secured the exclusive agency for the Hoffecker speedometer in northwestern Ohio.

The Croxton-Keeton Motor Company, Massillon, Ohio, opened a branch store at No. 16 Columbus avenue, Motor Mart, Boston, Mass. This store will be in charge of L. F. Witherell.

H. S. Firestone, the tire manufacturer, on the basis of specifications of purchasing departments of automobile makers, estimates that 135,000 new cars will be produced next year in this country.

Chauffeurs in Reading, Pa., are planning to organize a union and establish a minimum wage. The chauffeurs of the Reading Taxicab Company are also planning to organize a club for purely social purposes.

The Los Angeles (Cal.) Automobile Dealers' Association, at a meeting held on October 12, decided by a very close vote against holding another show late this year. The meeting was held at the Franklin agency.

At the last meeting of the Automobile Dealers' Association of Pittsburg the following officers were elected: W. N. Murray, president; Frank Haupt, vice president; J. E. McKeogh, secretary, and G. P. Moore, treasurer

The run for the Brazier Cup, held by the A. C. of Philadelphia, on October 16, was won by G. B. Fletcher, who drove a Packard car., Mr. Fletcher's number was 13, and he also had 13 penalty points assessed against him.

The New Idea Spreader Company, of Coldwater, Ohio, announces that it will soon place on the market a business man's automobile, which will be simple in construction. The company has been making farming machinery.

A decree has been granted to dissolve the Carrico Motor Company, of Cincinnati, Ohio, upon an application of O. E. Walker and others, and R. A. Le Blond has been instructed to take charge of the assets and wind up the concern.

The chauffeurs of Atlanta, Ga., met in the Austell Building on October 17, and organized an association. It is planned to secure suitable quarters and to arrange for a course of instruction in automobile mechanics. The following officers have been elected: C. W. McDade, president; C. H. Walsh, vice president; E. L. McIntyre, secretary; Thomas Lane, treasurer; James R. Moore, conductor; Robert Schnore, warden; W. B. Maddox, inner guard; C. F.

Cavell, outer guard; H. L. Bell, chaplain; E. Walter Tripp, organizer.

The report of Ohio State Automobile Registrar Fred H. Caley for the month ending October 15 shows the revenue of the department for the month to have been \$5,039. There were registered with the department 685 new owners, 15 manufacturers and dealers and 125 chauffeurs. Renewals of owners numbered 256.

The new Atlanta speedway which has been constructed at an approximate cost of \$300,000 by the Atlanta Automobile Association, has been turned over by the contractors to the owners. A number of trials are this week being held on the two mile track to discover any possible imperfections before the first regular meet is held.

A chain of agencies is to be established in Wisconsin by the Wadhams Oil and Grease Company, of Milwaukee. The first tanks will be established at Two Rivers, Wis. The concern does a large business with automobile manufacturers and garages and will pay special attention to transient trade in the smaller cities of the State.

A factory to be devoted almost exclusively to the manufacture of automobile bodies is being erected in Milwaukee, Wis., by Fred C. Schueler & Brother, wagon and carriage makers, who some time ago started the production of bodies on a small scale. The factory will be 40x120 feet in dimensions, three stories high, and cost \$35,000.

The Pierce-Arrow Motor Car Company, of Buffalo, N. Y., will again this winter conduct courses of instruction for owners of Pierce cars, drivers, and dealers and repair men. Each of the courses will be of fourteen days' duration. It is likely that two class terms will be set aside for colored drivers, as has been the custom in the past.

The city of Milwaukee will next year treat all of the main streets, parkways and boulevards with asphaltoilene, as it has been found from exhaustive tests that a square yard of street can be kept dustless all season at an expense of about 1 3-10 cents. A mixing plant and tanks have been located in Riverside Park.

Owing to the fact that the confetti car got lost and one of the contestants followed it, the referee of the recent sociability run from Indianapolis to French Lick has decided to award two prizes. One of these will go to Charles G. Gardner, who followed the correct route, and finished within one minute and fourteen seconds of the secret schedule, and the other to Will A. Atkins, who probably would have made about the same time had he not followed the confetti car.

On November 1 the advertising office of the White Company will be moved fro. a its present location at 1402 Broadway, New York City, to the White factory, 800-898 East Seventy-ninth street, Cleveland. R. H. Johnson, who for the last six years has been in charge of the advertising and publicity affairs of the company, will continue his duties as advertising manager at the new address, Mr. Johnston will change

his place of residence from the Engineers' Club, New York, to the Hollenden Hotel, Cleveland.

A new type of automobile tire, claimed to be absolutely puncture proof, will soon make its appearance in Milwaukee, Wis. William A. Schoen, a manufacturer and president of the Milwaukee fire and police commission, announces that he has acquired an interest in the invention, and that a company will be organized to manufacture the tire in Milwaukee.

The Bosch Magneto Company have established a Western and Pacific Coast branch at 537 Van Ness avenue, San Francisco, Cal. The new branch will be equipped similarly to the Chicago branch, and will carry a complete stock of Bosch magnetos, parts and fittings. B. F. Brinkman will be manager of the branch, which was formally opened on October 20.

#### Crown Point-Lowell Grand Stand Taken Down.

The officials of the Chicago A. C. have given orders for the demolishing of the grand stand which was erected at Crown Point, Ind., last year for the Crown Point-Lowell races, and which has a capacity of 10,000. The wrecking work has already begun. It will be remembered that the race resulted in a deficit of \$30,000, and it was concluded that the club had abandoned the idea of holding another race on the course.

The officials of the club state, however, that the fact that the grand stand is at present being taken down does not indicate that the club will not repeat the race which it held on the Indiana circuit last summer. The grand stand, it is stated, was erected on a salvage basis by a Crown Point contractor, who has been endeavoring to get the club to make an agreement to use it next year, but the latter would not assume any obligation in the matter.

# Motor Speedway Planned for Detroit.

Plans are maturing for the construction of a model speedway in the vicinity of Detroit, Mich. The promoters are said to include "Bob" Oakman, and a leading automobile manufacturer in a city a short distance from Detroit. Options have been secured on two sites by the parties interested. Both of these tracts are located near the Grosse Point trotting track on East Jefferson avenue. One of the tracts has an area of over 400 acres and the other of 360 acres. The turns are to have a radius of 1,000 feet, and the straight-aways are to be similar to those of the Indianapolis Speedway. The course is to be laid out to the same general shape as the Indianapolis Speedway, making the distance around the outside between 21/2 and 3 miles, and the total distance around the outside and through the infield 5 miles. The outside circuit is to be paved with brick or creosote block.

# Garage Notes

TAYLORVILLE, ILL.—The Christian County Auto Sales and Garage Company are looking for a site on which to erect a one-story 40x125 feet building.

MILWAUKEE, WIS.—Koss Bros., Belleview place and Downer avenue, are building a \$10,000 addition to their garage. The addition has dimensions of 30x80 feet, one story high.

ROCKVILLE, IND.—S. F. Puett and Frank

ROCKVILLE, IND.—S. F. Puett and Frank M, Adams have purchased the F. R. Calvert garage west of the Parke Hotel. Mr. Calvert will go to Lake Charles, La., to conduct a garage business there.

BEAUMONT, TEX.—Louis Durango, manager of the Beaumont Motor Car Company, has purchased the interest of the Houston Motor Car Company in that concern, and is now looking for a suitable carrage.

a suitable garage.

EL RENO, OKLA.—John Ozum is to erect a 36x100 feet garage on Hayes street between Evans and Grand avenues. It will contain a first-class repair shop, over which Jim Gephart, of Oklahoma City, will have charge.

City, will have charge.

TRAVERSE CITY, MICH.—A. J. Peteryl, proprietor of the Traverse City Wagon Works, will remodel his two-story brick building on Union street as a garage. The lower portion of the building will be cement floored.

SAN FRANCISCO, CAL.—Hazlitt L. Pelton, one of the best known automobile dealers on the Coast, has assumed the position of sales manager for the Wagner-Reniff Motor Car Company, agents for the Auburn car, and will also handle the Columbia in northern California.

FALL RIVER, MASS.—Robert W. Powers, who has been the local representative for Peck & White, carriage and automobile dealers, for the past seventeen years, has secured control of the business. Mr. Powers will handle Peerless, Pope-Hartford, Buick, Oldsmobile and Oakland cars.

HOUGHTON, MICH.—The Northern Garage and Supply Company will open a garage on the water front, east of the Amphidrome. The building is a two-story 50x100 feet structure. A complete retreading and vulcanizing plant is to be installed. Ernest Hanson will have charge of the repair department.

RHINELANDER, WIS.—J. H. Morgan has organized the Morgan Garage Co., and has opened for business at 22 South Stevens street, Rhinelander. The electrical business conducted by W. H. Gilligan has been consolidated with the garage, and Mr. Gilligan will join the company as manager of the electrical department.

CHICAGO, ILL.—The local branch of the Overland Automobile Company will take over the entire equipment of the Auto Rebuilding and Machine Company, of 1720 Michigan avenue, and will move immediately to that address from its present location at 1413 Michigan avenue. John Phillapot, who was formerly connected with the Olds Motor Works, will be superintendent of the rebuilding and machine work department.

KANSAS CITY, MO.—An ordinance giving Theodore Winningham permission to erect a garage on South Main street, between 36th and 37th streets, was taken up for discussion by the fire committee, who recommended that the permit be revoked, as Mr. Winningham asked to build the garage flush with the street property line, while a special ordinance requires that all garages and livery stables be set back 16 2-3 feet from the sidewalk.

MILWAUKEE, WIS.—The main garage of the Jonas Automobile Co., one of the largest agencies in the Northwest, has been transferred from 726-728 National avenue to 417-421 Wells street. The Jones company, handling the Cadillac and Peerless, found the National avenue location to be too far removed from the business district. The Wells street garage was built last winter for the \* of the W. L. Hibbard Motor Car Co., which gone out of business.

# New Incorporations

The South Texas Automobile Company, Falls City, Tex.—Capital stock increased from \$3,000 to \$5,000.

The Oswald Motor Company, Goshen, Ind.— Increase of capital stock from \$30,000 to \$40,000. J. E. Newell, president.

Colonial Motor Car Company, Springfield, O.— Capital stock, \$3,000. Incorporators, W. L. Crist, J. A. White, Wm. J. McDaniel.

The Dover Inn Auto Club Company, Dover, N. J.—Capital stock, \$6,000. Incorporators, Fred Lyons, I. Strauss and Sarah Albers.

The Herold Reo Company, Cincinnati, O.— Capital stock, \$5,000. Incorporators R. Herold, T. M. Herold, John A. Smith and M. B. Smith.

The Payne Motor Company, Cincinnati, O.—Capital stock, \$10,000. Incorporators, R. S. Payne, E. E. Berry, A. M. Cohen and Alfred Mack.

Harriman Garage Company, Nashville, Tenn.—Capital stock, \$5,000. Incorporators, M. V. Thornton, M. Stover, F. M. Kennedy, L. O. Scott and J. W. Scott.

The Bowling Green Automobile Company, Bowling Green, Ky.—Capital stock, \$5,000. Incorporators, C. H. Smith, W. F. Toops, L. H. Conkin and Harry Ennis.

The Utah Motor Company, Salt Lake City, Utah.—Capital stock, \$1,000. Incorporators, D. C. Jackling, Chas. W. Whitely, Jos. W. Bidwell, John M. Hayes and W. P. Joy.

Elmore Mfg. Company, Clyde, O.—Capital stock, \$600,000. To manufacture automobiles. Incoporators, James H. Becker, B. A. Becker, M. A. Becker and B. H. Becker.

The Indiana Motor and Mfg. Company, Indianapolis, Ind.—Capital stock, \$100,000. Incorporators, Chas. B. Riley, John E. Matson, John C. Billheimer, C. C. Jones and others.

Knoxville Everglade Company of Knox County, Nashville, Tenn.—Capital stock, \$10,000. Incorporaters, W. D. Williams, J. W. Provost, J. M. Cassil, J. R. Williams and John W. Green.

The Anhut Motor Company, Detroit, Mich.— Capital stock, \$150,000. Incorporators, J. N. Anhut, Mayor Breitmeyer, H. H. Thorpe, John B. Chaddock, Thos. Ahern and John Gillespie.

Chaddock, Thos. Ahern and Join.

The Veerac Motor Company, Minneapolis, Minn.—Capital stock, \$400,000. Incorporators, Virgil Dillin, W. E. Decker, W. A. Zalondeck, F. K. Sullivan, W. A. Parjer, G. W. Buffington and F. H. Merrill.

American Automobile Aerial Road Company, Wellsburg, W. Va.—Capital stock, \$250,000. Incorporators, Assa G. Neville, F. A. Chapman, Assa A. Neville, of Wellsburg; Chas. L. Foreman, Steubensville, O., and John Ehmann, Cincinnati, O.



Boston, Mass.—V. J. Jacobs, Pierce.
Dallas, Tex.—Arthur Ove, Kissel Kar.
Atlanta, Ga.—Tyrus Cobb, Hupmobile.
Portland, Ore.—Fred Bennett, Renault.
Trenton, N. J.—Harry J. Stout, Pullman.
Trenton, N. J.—R. C. Manning, Autocar.
Atlanta, Ga.—Dr. H. K. Schwartz, White.
Luverne, Minn.—H. Bierkamp & Son, Buick.
Los Angeles, Cal.—Coney C. Slaughter, Stearns.
Houston, Tex.—Olds-Oakland Company, Rapid.
Cincinnati, O.—Imperial Motor Car Company,
Gaeth.

Osakis, Minn.—Guy Livingston, Jackson and Fuller.

St. Joseph, Mo.—Emmett Beckley, White steamer.

Washington, D. C.—L. P. Dorsett Company, Mitchell.

Dayton, O.—The Peckham Motor Car Company, Franklin.

Denver, Col.—Sanford Automobile Co., Crox-ton-Keeton.

El Paso, Tex.—Mosehart & Keller Automobile Co., Haynes.

Newton, Mass.—Evans & Warren, 24 Brooks street, Austin.

Houston, Tex.—Auto & Motor Boat Co., Franklin and Metz.

Oneonta, N. Y.—The Oneonta Automobile Garage, Buick.

Salt Lake City, Utah.—Booklidge-Gilmer Co., Croxton-Keeton.

Harrisburg, Pa.—C. C. Oyster, 9 North Market street, American.

St. Louis, Mo.—The General Motor Car Company, Hupmobile.

Seattle, Wash.—Overland Auto. Company of Washington, Overland.

Chicago, Ill.—United Motors Company, 1507 Michigan avenue. Sterling.

Minneapolis, Minn.—The Motor Sales Company, 409 Fifth street, S., Petrel.

Syracuse, N. Y.—Fred A. Marshall & Son, 231 Jefferson street, Hupmobile.



Walter C. Guilder, formerly engineer of the Plymouth Motor Truck Co., is now connected with the Garford plant in Elyria, Ohio.

George Soules, the well known racing driver, has joined the Overland Automobile Company, Toledo, Ohio, and will have charge of their testing staff.

Walter C. White, of the White Company, Cleveland, Ohio, will sail from New York on November 6 for his annual visit to the company's London branch.

Hayden Eames and Le Roy Pelletier, of the Studebaker Automobile Company, are at present making a trip to the branches of the company in the different large cities of the country.

G. H. Covert, Jr., has accepted the position of general manager of the Warner Motor Company, of Washington, D. C., succeeding A. Parker Warner, who will enter another line of business.

ner, who will enter another line of business.

H. W. Doherty, sales manager for the Cameron Car Co., Beverly, Mass., for the past two years, resigns his position with that company November 1. Mr. Doherty has not as yet announced his plans for the future.

The Toledo Times of October 17 contains a biographical sketch of President John N. Willys, of the Overland Automobile Company, who in a few years has built up one of the largest manufacturing concerns in the automobile line.

Charles R. Folsom has been appointed manager of the automobile fender plant of the C. G. Folsom Manufacturing Company, South Bend. Ind. The plant is located on West Sample street, near Union, and has been opened only recently.

Frank S. Davies has been appointed chief engineer of the Courier Car Company, of Dayton. Ohio. Mr. Davies was for several years chief engineer of the Pope Motor Car Company, of Toledo, Ohio, and then went with the De Luxe Motor Car Company, of Detroit.

A. D. Frost, formerly sales manager for the Harry S. Houpt Co., in which capacity he had charge of the distribution of the 1909 Herrestoff car, has been appointed sales manager of the Herreshoff Motor Co. of Detroit, Mich., whose output from now on is to be marketed direct from the factory.

W. S. Cranmer, who has been connected with various electric vehicle concerns for the past ten years, and lately with the Woods Motor Vehicle Company, of Chicago, has been appointed manager of the Woods electric department of the Moore Carving Machine Company, of Minneapolis, Minn. The company plans to install a full line of equipment for the care and repair of electric vehicles.

# The Horseless Age

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#### Calculation of Chassis Springs-I.

BY DAVID LANDAU AND ASHER GOLDEN.

One of the chief uses of a motor car is to give pleasure to its occupants. The occupants of a car do not derive any pleasure from its use unless they are comfortable, and nothing conduces to comfort so much as easy riding springs.

A great deal has been said and written on this important subject, yet it may be safely said that there is no other feature of the automobile about which so little is known. There are very few designers who can lay out a set of springs for a given car and feel assured that they will have the proper riding qualities; that is to say, that no alterations of any kind will be necessary after the springs are supplied by the maker from the designer's specifications.

When we speak of laying out a set of springs we mean to include, besides the data and dimensions usually found on blue prints, such other factors as the number of leaves, their thickness, the deflection under a given load (flexibility) and the material.

The data and dimensions usually found on blue prints which are supplied to the spring maker as working drawings are:

1. The projected length of the spring (main leaf) under load. 2. Opening or camber of the spring under load. 3. "Eccentration" of the spring centre; that is, the distances of the spring centre from the centres of the spring eyes. 4. Width of the leaves. 5. Load on each spring or per three springs if of the platform type.

6. Various details, such as the form of the spring eyes, size of bushings, form and number of clips, etc.

This information is supplied to the spring maker, whose knowledge and experience are to dictate the missing factors, such as the number of leaves, their thicknesses and the flexibility. In a few cases engineers attempt to take the spring maker by the forelock and specify the number of leaves, their thickness, the deflection desired under a given load; also the material, which is invariably "spring steel."

In many cases an order for springs is accompanied by a note to the spring maker to this effect: "We prefer to leave the number of leaves and their thickness to your judgment." The engineer would seldom include this note if he knew that the average spring maker knows very little more about such matters than he

does. This statement may seem to some to be very sweeping. That it is true will be seen from extracts of letters received from a number of spring makers in answer to inquiries for complete characteristics and prices of springs intended for a certain car. These letters of inquiry were sent out in the regular way by a well known automobile manufacturer in the effort to procure a good spring. These letters show that spring designing is a difficult art. The specification of the characteristics was evaded by the spring makers in practically all cases, and it was only after repeated inquiry that two or three specified the weight of the springs and nothing more. Such an important matter as the flexibility was not even mentioned.

The following are some of the replies received. We have italicized the important parts:

"In making springs we reserve the right to a difference of fifty pounds in carrying capacity of springs on account of the in-

"Your blue prints call for no particular carrying capacity, but we presume that these springs are wanted for a car of somewhat similar proportions to the X car. These springs, we expect, will weigh about 45 pounds per pair for fronts and 125 pounds per pair for backs.

"We are now making springs for the X people of dimensions similar to the ones you have submitted to us for their five-passenger touring car. If we have guessed rightly, our quotations will stand."

It must be remarked here that owing to an oversight on the part of the engineering department the blue prints were sent out without specifying the loads on the springs.

"We note the weight given on both front and rear springs. From this we can figure, with tolerable accuracy how strong to make your springs, so as to have the front springs sufficiently strong to hold the front of the car well in hand so as to steer easily, and your rear springs with sufficient elasticity to make the car ride easily.

"This, however, is a matter of estimate only, which can be verified only by trying out the first set on the road. It may then be found necessary to add or deduct a little weight from the springs so as to get them just to your satisfaction.

"As to the material of these springs, it is a high carbon steel of the best make. We can give you these springs made of alloy steel, which we are importing from Germany. We do not know the tensile strength of these spring steels, nor the elastic limit when tempered. Nor do such figures give any assurance of freedom from breakage or settling so far as we know. The springs, however, when made up, have a greater elasticity—greater than is likely to be called for in practice. As for alloy steel, the elastic limit in the springs is still greater."

This firm professes to know nothing of the material it uses other than that it is imported from Germany. The elastic limit for alloy steel is stated to be higher in the finished spring, although such figures give no assurance of freedom from breakage or settling.

"We will be very glad to make up one or more sets of either of these steels or both, and submit for your testing, inspection and tryout. If we do not succeed in fitting your car directly, we should be very pleased to make a second effort if necessary, as we are as careful to have then thoroughly balanced, and a proper capacity before we say they are right, before we feel they belong to anybody except us, and until that time comes the springs are on approval thoroughly and fully.

"When they shall have been perfectly satisfactory to both you and us, all the deductions you will be pleased to make can be made at your factory, regarding weights, fronts and rears, severally and collectively.

"The weight of the front springs per pair will be 44 pounds for open hearth and 41 pounds for vanadium.

"Weight of the rear springs per pair will be 90 pounds in open hearth, 87 pounds in the vanadium steel.

"I figure this spring should weigh approximately 180 pounds."

The springs, as finally made by the foremost spring manufacturer, weighed 157 pounds per set.

TEST DATA CONVENTIONS.

A test of a set of springs made by one manufacturer was reported as follows:

FRONT.

"2x8x36 at 3½ inch out x 5½ inch out, fa centre bolt, 2-3-3-4-4-4-4 steel, 5½ inch bush, true sweep, lips 3, clip 3d and 5th, two leaves drawn to end, short plate 12 inch.

"Test at 31/2 inch out 700 pounds. 400 pounds per inch.

REAR.

"21/4x7/6x441/2 at 85/2 inch in to out x 7

inch bottom, 8 inch top, 5% inch CB top, 18 CB 18 out bottom, 1-2-3-4-4-5-5-5 steel top, 1/2 inch bush scroll end, 5% inch bush front end, lips 5 top, lips 61/2 bottom, clip 3d scroll end, top and bottom, clip 2d and 4th front end, 7 inch flat top countersunk, 72 degrees 21/2 inch drop.

"Tests at 85% inch to out 890 pounds. 200 per inch."

On the receipt of this edifying information, a letter was written to the spring maker inquiring what it was all about, and the spring maker sent the following letter of information:

"We are in receipt of your favor of the —— and have carefully noted same. Regarding our letter of —— and test sheet covering the X car, I have noted your remarks and unless you have any knowledge of springs, the proposition is Greek solution.

"Now in regard to the front springs, the two indicated on the test sheet is the width of the steel. We read in this way, width of steel, No. of plates, length, at height given, normal height, grading of steel Stubs English standard gauge, and so on. Now to go into this matter, would say that this specification reads as follows: Two inch wide, 8 leaves, 36 inches long, at 31/2 inches over all, and that the original opening of the springs is 51/4 inch, that it is graded one plate of No. 2, two plates of No. 3 and five plates of No. 5 steel, that the spring is put up on a true sweep pattern or a pattern forming a certain radius of a circle, that the springs have side lips to prevent the leaves from sliding, and that the springs when deflected to a position shown on your blue print of 31/2 inches over sustain a weight of 700 pounds. On the rear springs these are read practically the same way.

"The leaves are 21/2 inches wide, seven plates on the top and eight plates on the bottom, 441/2 inches centre to centre, that it is 85% inches from spring seat to spring seat, or inside to outside measurement, as we term it, that the original opening of the top is 8 inches and the opening of the bottom is 7 inches, that there is a 5% inch centre bolt in the top and a fa inch centre bolt in the bottom, is inch off centre, that the top half is graded one plate of No. 1, one plate of No. 2, one plate of No. 3, and the balance of No. 4 steel, and the bottom is graded one plate of No.' I, one plate of No. 3, two plates of No. 4, and the balance of No. 5 Stubs English standard gauge, that there is a 1/2 inch steel bush in the scroll end, and a 5% inch bush on the front end, and that there are lips on five plates on the top and six and one-half plates on the bottom, which, by the way, are to keep the plates from sliding sidewise, or commonly called lugs, that the springs are clipped third top and bottom on the rear end and clipped second and fourth on the front end, that the top part is 7 inches flat for the spring seat, and that when the springs are compressed to 85% inches from the inside of the top half to the outside of the bottom half, or from spring seat to

spring seat, sustains a weight of 890 pounds, or 200 pounds per inch deflection. The 2½ inches drop indicated on this test sheet is the drop that the front end of the rear spring has from the centre line of the spring.

"We trust that with this information you will understand what the test sheet means, and if not, come back to us and we will endeavor to straighten you out. I hope within a short time to have a plain proposition which will obviate a lot of this trouble we are now having."

#### TEXT BOOK ADVICE.

The method usually employed by the average engineer or the average spring maker for the "calculation" of springs is shown very well in Strickland's "Petrol Motors and Motor Cars." Referring to the index we find "Springs, Calculation of Dimensions, 219." On page 219 we come across the following painstaking "calculation":

"A car weighing 18 cwt., and built for four people, had springs as follows: Front springs, single elliptic, 3 feet 4 inches long, 11/2 inches wide, with four leaves 1/4 inch thick. Back springs, single elliptic, with cross back spring, side spring 3 feet long, 11/2 inches wide, and five leaves 1/4 inch thick. Cross back spring same dimensions as side springs. The springs were tempered fairly hard, and gave pretty easy running, but were too jumpy. They were softened till quite soft, and three leaves were added to each of the back springs. and two leaves to each of the front ones. The result was that the springs were just about as strong as before-i. e., gave just about the same amount under the same load. but the increase in comfort in the car was very great. It will be evident from the above that no formula can be given for the strength of springs, unless the exact nature of the steel they are made of is known. The above, however, proved very satisfactory."

We confess to our inability to see how, if the springs "gave just the same amount under the same load," the riding qualities of the springs were improved. In regard to the statement that no formula can be given for the strength of springs without a knowledge of the materials of which they are made, it should be remarked that a formula for the strength of a spring, like formulas for the strength of other parts, is not a function of the properties of the material, but depends on the shape of the section and the distribution of the surface of the section about the neutral axis. A formula for the strength of a spring is given in the course of this article.

At the July, 1907, meeting of the Society of Automobile Engineers, during the discussion of a paper on "Motor Vehicle Springs," one engineer remarked:

"There are almost no data in the text books or elsewhere that are of any real value in laying out a set of springs for a vehicle, and the quickest method I have found is to measure up the springs on a number of similar vehicles and then make a close guess, and afterward change them until you get them as nearly right as possible. I have talked with a number of engineers, and that seems to be the general practice. There is a great deal of doubt and haziness in regards to spring data and materials."

The engineer is very fortunate who can find vehicles similar in every respect to his own. Moreover, he must be an adept at the art of guessing right. Besides, what assurance is there that the similar vehicles will have good suspensions—some may be too hard, other too soft.

#### A SUCCESSFUL EXPERIMENT.

Our own experiments to find an easy riding spring for a certain runabout are of interest. During the early part of 1907 a number of sets of springs of the following dimensions and characteristics (all of which were specified and supplied to the maker) were ordered of a certain spring manufacturer, and one of them placed on a chassis for testing. After a fair run over rough roads it was reported that the springs were too stiff

	Front.	Rear.
Type of spring	Semi-elliptic.	Semi-elliptic.
Length under load	341/2	4134
Opening under load.	31/2	4%
Width of leaves	134	134
Number of leaves	5	5
Load on each spring,	-	
pounds	375	375

Thickness of leaves. { 9-32 in. top, re- 5-16 in. top, re- mainder, 1/4 in. mainder, 1/4 in. Material (as usual), "spring steel."

The front and rear springs were found to have a flexibility of .21 inch per 100 pounds and .398 inch per 100 pounds, respectively, as against .28 inch and .51 inch specified for the same car by a well known manufacturer. The latter flexibilities were assumed to be correct in order to give us a working basis for the determination of the flexibilities to suit our particular case.

Experiments were begun by removing the middle leaves of all the springs. The springs were then replaced and the car was taken out over the same roads. The springs were reported as being very satisfactory. The flexibilities were again measured and found to be .292 inch per 100 pounds for the front and .512 inch per 100 pounds for the rear. It was a happy strike that gave us, as the result of a single experiment, a flexibility which was practically the same as our basis. This simple test enabled us to specify the flexibility-practically the only unknown factor in the design of a springor, in place of this, the exact number of leaves and their thickness. There is no reason why the spring maker's experience should not have dictated the proper flexibilities from the data and dimensions which we submitted. We were surprised to find that on putting a second set of springs through the same test and removing the middle leaves the result was entirely different, so that the fault was evidently with the materials and the condition of the surfaces of contact of the leaves.

(To be continued.)

# GREAT QUESTIONS OF AUTOMOBILE ENGINEERING.

#### Introduction.

Despite the very strong tendency lately manifested toward uniformity of practice in automobile engineering the methods adopted by various manufacturers to accomplish the same technical ends still exhibit plenty of diversity.

These diversities in practice are the tangible expression of the fact that there are certain important engineering problems which are as yet unsettled, so that one engineer prefers a certain solution while his neighbor adopts a different or a contrary one.

Such alternative methods form the subject matter of endless discussions upon the part of all who are technically interested in the automobile, but it is hardly to be believed that the superiority of one method over another can ever be demonstrated on a priori grounds. Long continued "trying out" in everyday service must be the final arbiter, and, indeed, it is doubtful whether one method will ever prove universally to possess any intrinsic balance of advantages over the alternative practice, for circumstances of use and the manner in which each method is carried out may render one superior under one set of conditions and the other most satisfactory under its own appropriate circumstances.

In general, where alternative methods are in vogue, both answer the purpose in a fairly satisfactory manner, for were this not the case it is obvious that one method or the other would have become obsolete before this rather advanced period of the industry.

While it may be admitted that the final settlement of the superiority of one method over its alternative or alternatives is beyond the present ability of any engineer, and to be reached only through the results of future experience, it is possible to bring together, in compact form and in an impartial spirit, the chief arguments which are adduced pro and con. these alternative methods by their supporters and detractors, thus placing the matters in contention in such shape that the reader may weigh the evidence and form his own verdict as to which possesses the balance of merit, as viewed from his own standpoint.

It is exactly this which is attempted in this series of articles upon "Great Problems of Automobile Engineering."

## Air Cooling versus Water Cooling. By Albert L. Clough.

The ends which an engine cooling system is designed to attain are as follows:

- (1.) To maintain the cylinder and piston at a temperature at which the action of a reasonable quantity of oil will insure effective Inbrication.
- (2.) To prevent relative expansion and distortion of the piston and cylinder under

the heat of the combustion, which would result in undue friction, and to prevent valves from warping and pitting from the same cause.

- (3.) To limit the temperature to which the charge is subjected to a value at which self ignition cannot occur.
- (4.) To minimize the preheating and consequent reduction in energy value of the entering charge.

It is claimed for each system of cooling that all these ends are attained by it in a satisfactory manner. In a general way air cooling is claimed to secure the desired results in a simpler and more direct manner than does water cooling, while on the other hand the supporters of water cooling insist that their system insures much more reliable results and possesses a greater factor of safety to cover unskilled handling and excessively arduous service.

Among the points of superiority which are cited in favor of air cooling are the following:

That the directness of the system, attained by allowing the cooling medium to come directly into contact with the surfaces to be cooled and to abstract from them the necessary amount of surplus heat, permits of the elimination of considerable apparatus which otherwise is required. The radiator, with its fragility, liability to leakage, cost and weight, is dispensed with; the pump, with its driving mechanism, is done away with, and the equipment relieved of just so much complication and the operator of the required lubrication and repackings.

All water piping, with its tendency to leak and to render the parts of the motor less accessible, is avoided. No water jacket being provided, the cylinder casting is simpler and lighter and more readily inspected for defects.

Air is a cooling medium which is always at hand in infinite quantities, while water is only to be had at certain points, and the supply on hand must be maintained by the operator at some little bother.

It is claimed that by the adoption of air cooling the power plant is rendered more simple and lighter by the amount of the water carried, the pump, piping and radiator, and that the ability of the vehicle is consequently increased, while the operator is at once relieved of all care concerning his cooling system, since there is nothing to leak or boil away and require replenishment. No liquid being used as a cooling medium, there is nothing to freeze and burst the walls of the system, and thus the car may be used in any weather, no matter how cold, and may be stored in an unheated stable without any precautions being necessary.

The advocate of air cooling holds that the simplest method capable of affording satisfactory results is the best, and that the use of a water circulating system to convey the heat from the point of its development to a special radiator and there dissipating it is a sort of a mechanical journey "around Hobin Hood's barn."

He claims, furthermore, that while air cooling reduces the cylinder temperature to a perfectly safe point it does not overdo the matter, but keeps the walls at a sufficiently high temperature so that the heat losses therethrough are limited to a practical minimum. This results in the attainment of higher mean effective pressures and a much higher fuel efficiency.

It is asserted in this connection that a vehicle engine is most efficient when its cylinder wall temperature is about 350° Fahr., and that it is impossible to realize so high a temperature when water jacketing is adopted, since water boils at 212° Fahr.

As practical examples of the superiority of air cooling, its devotees point to a transcontinental record held by an air cooled car to the performance of "direct cooled" cars in Glidden Tours which have involved supremely arduous driving conditions, and also to the success obtained by a large numof private users who operate their cars in winter as well as in summer. They also cite the consistent victories of air cooled cars in the principal fuel economy tests.

Turning to the claims of the water cooled contingent it is found that they also present a strong case, among the items of which are the following:

That water cooling, so long as the system is rightly designed, kept well filled and an active circulation maintained, does not permit of the attainment of cylinder wall or valve pocket temperatures of more than a few degrees in excess of 212° Fahr., at which temperature neither faulty lubrication, binding of the parts nor self ignitions can occur. The water may gradually boil away, but no matter how unskilled the operator may be, how much he may run on an unnecessarily low gear, or how much he may mishandle his throttle and spark lever, the motor cannot be overheated to the point of serious reduction in power or complete "lying down." In other words, that a margin of cooling capactity is provided which is possible only in a system employing a circulating medium possessing a maximum attainable temperature, fixed by its physical properties.

There are two other claims based upon this assumption that a water cooled cylinder cannot greatly exceed the boiling temperature, namely: First, that a higher compression pressure may be carried therein than could safely be allowed did the temperature rise to higher values, as in an air cooled cylinder. This assertion is based upon the fact that the likelihood of self ignition at a given gas pressure is greater in proportion as the temperature of the gas

is higher. The advocate of water cooling takes the ground that the higher compression pressures practicable under his system are of decided thermodynamic advantage. Second, that with the cylinder walls maintained at a temperature hardly exceeding 212° Fahr., there is but slight preheating of the charge, as compared with the preheating suffered in the case of a cylinder operating at a much higher, variable temperature, and that consequently the water cooled cylinder draws nearly its full theoretical weight of mixture each stroke, and its output per cubic inch of piston displacement is thus greater than is that of the hotter cylinder.

It is also asserted that the water cooling system permits of more readily regulating within safe limits the temperature of the valves without recourse to unusual valve arrangements and special provisions for disposing of the exhaust. By water jacketing the valves it is claimed that greater reliability and freedom from distortion and burning is obtained than by a dependence upon air cooling.

As a practical indication of the superiority of water cooling, its supporters call attention to the fact that its use enormously preponderates over that of air cooling, that all speed records have been achieved by water cooled cars, and that a number of manufacturers formerly building air coolers have renounced the method and adopted water cooling.

The disadvantages of air cooling, as set forth by its detractors, include the following, and it is only fair to state that it is highly questionable whether they all apply to the better class of air coolers:

That while air cooled cars may be made to give excellent results in the hands of experts or skilled operators, the margin of cooling capacity is too restricted successfully to meet deranged conditions of the carburetor, excessively severe driving conditions in hot weather and the mishandling due to an unskilled operator. Under such abnormally adverse conditions it is claimed that the air cooled motor is prone to run too hot, and to preignite and to lose power through charge reduction.

The belief is also still held, in some quarters, that air coolers require an excessive quantity of lubricating oil to insure successful operation, the lubricant being more rapidly evaporated from the cylinder walls and ejected with the exhaust or burned as a component of the mixture than is the case with water cooled motors.

Greater liability to valve breakage, distortion and scaling are also vices which are still held to appertain to the air cooler, while it is furthermore asserted that the average air cooled motor is less quiet in operation than the average water cooler under similar circumstances.

The restriction of air cooled practice to relatively low compression pressures and the undue reduction of the charge ratio on account of preheating also constitute objections raised by the members of the opposing school.

Extreme sensitiveness to excess surplus heat given to the cylinder walls by slow burning mixtures and weak or unduly delayed ignition is also said to characterize the air cooler and to lead to its faulty performance under hard service.

The air cooled contingent reply to their rivals by asserting that the margin of cooling which its system affords is sufficient to meet practical requirements and that its use relieves the operator of all anxiety upon the score of cooling; that it is unnecessary to deal with objectionable cooling liquids or to take any other cold weather precautions. They assert that it is as foolish as it is unnecessary to cumber the car with a "plumbing job" and that the dead weight of the water cooling system is a serious drawback. They assert further that heat losses to a cold cylinder constitute a constant and very substantial demand upon the fuel tank which the air cooling system materially reduces, and they also cite figures from economy tests to prove that the assertion that an air cooled motor is in reality an "oil cooled" motor is a pure fabrication.

## Official Trials of Individual Cars by the Automobile Club of France.

The technical committee of the A. C. of France have decided to superintend trials of individual vehicles by manufacturers under conditions which the committee will determine after having been informed of the tests which the manufacturer desires to have carried out. The technical committee may designate official delegates for road trials who will be selected from a list of names established by them. These delegates will be furnished for each trial with a question blank which they must fill out, and the duties of the delegates will be limited to determining the answers to the questions contained in the blank. The delegates are not allowed to modify the questions in any way, which, moreover, must be accepted beforehand by the manufacturer. After having gone over the replies to the questions written out by the delegates the technical committee will draw up its report, which will remain the property of the manufacturer, and will be published only with his consent, and, after a decision to that effect has been taken by the committee, in the official bulletin of the committee. The expenses of the delegates during the time of the trial must be borne by the manufacturer. A charge of 50 francs per day is made for the delegate and 10 francs per day for the work of the committee in drawing up the report. During the time of the trial the delegate is considered in the employ of the manufacturer, and all civil and penal responsibility rest upon the latter. Such officially supervised trials have for years been conducted in England, and British makers and agents have frequently availed themselves of the opportunity thus offered.



#### Some Repair Shop Notes.

CHANGING INNER TUBES UNDER DIFFICULTIES.

While making a road test of a car to be used in a race the testing crew from one of the better known factories had the misfortune to get a puncture, and discovered that they had nothing to repair the damage except a spare inner tube—no tire tools, no jacks, and the nearest garage miles away. The tire was first worked off by hand and the car then blocked up with the aid of stones and a fence rail. The tire with the new tube in was then worked back on, and the return run was safely made, but on all succeeding trips a full set of tools and spares was carried.

#### DOUBLE GAS LINES TO HEADLIGHTS.

One of the firms which take part in twenty-four hour and other long distance races requiring driving in the dark finds it a great advantage to run duplicate gas tubes to the lights. In their past experience they have often suffered much inconvenience when the racing extended into the night, from accidents to the lights, and the liability of such accidents is greatly reduced by double piping. They also run the tubes exposed where they are easily accessible, and tape them so that even if a leak develops it may not put the line entirely out of commission.

#### REMAGNETIZING THE FORD MAGNETO.

The field magnets of magnetos occasionally become weakened, owing to road vibration or from other causes, and the Ford Motor Company has worked out a simple plan for remagnetizing the fields of its flywheel magneto when they begin to show signs of weakness. This consists in sending current from a 6 volt storage battery through the armature coil and taking care that the north poles of the fields are opposite the south poles of the armature. The current is not passed continuously, but the circuit is rapidly made and broken, and in this way, we are told, the field magnets can be restored to their full strength in about half an hour. Great care must be exercised to get the field and armature poles in the proper relation before applying the battery current, as otherwise the field magnets may be entirely demagnetized. The north poles and south poles of the armature and field can be determined by means of a compass.

#### A DISC CLUTCH REPAIR

In a certain make of car equipped with a disc clutch it is found that the operating fingers and pressure plates sometimes become worn at the points of contact, so that it is impossible to properly engage and disengage the clutch. This trouble has been remedied by a New York shop by tapping and drilling the operating fingers and inserting set screws. The set screws are provided with jam nuts, and the fingers are then easily adjustable for wear. The method has been applied to a number of cars, and is said to have proved entirely satisfactory.

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#### New Article Series.

In the present issue we begin a series of articles under the heading "Great Questions of Automobile Engineering." This series covers such subjects as Air Cooling vs. Water Cooling, Shaft Drive vs. Chain Drive, High Tension vs. Low Tension, Ignition, etc. These articles are written, not with the intention of aiding the engineer in solving these problems, but for the benefit of automobile sellers and buyers-salesmen and their customers-in whose intercourse these questions come up for discussion every day. The articles are designed to acquaint the readers with all the strong and weak points of each system of construction and should prove invaluable to those intending to purchase cars the coming winter or spring, as well as to the sales-

The articles will be written from an entirely unbiased standpoint, the writers confining themselves to an exposition of the

claims made by the champions of the different systems, and of the objections raised by them to the rival systems, so far as these claims and objections have a semblance of validity. Although the discussion will be entirely non-partisan, in cases where objections have been made to one system or another, that never had any foundation in fact, or which no longer apply, this may be pointed out. In case a good point of any system should be inadvertently omitted or objections should be named which are obviously foundationless, our readers are requested to call attention to the fact.

#### International and Interstate Recognition of Automobile Licenses.

Several of the leading European nations at a convention held in Paris during the first half of the past month subscribed to an agreement whereby a motorist who has complied with all the legal requirements in his home country will be permitted to drive in any of the other subscribing countries without any formalities, provided he attaches to the rear of his car, in addition to his regular registration number tag, a tag bearing a letter designating the country of his residence. A complete report of the sessions of the convention was printed in our last week's issue, and the agreement is printed in full in this week's issue.

The matter is of direct interest only to a relatively small number of American motorists, but we believe that the agreement can be used to good advantagein furthering the movements in favor of Federal registration and interstate recognition of automobile licenses. It is interesting to note that the United States, although represented at the congress, did not subscribe to the agreement. Our delegate, W. S. Hogan, will make a report of the convention to the Government at Washington. There is, of course, some question as to whether the National Government can consistently enter into such an agreement. If it should do so it would be a recognition of automobile traffic as interstate commerce, and the action of the Government would at once sweep aside all objections which have hitherto been raised against a Federal registration law. If the Federal Government possesses the power to give permission to foreign motorists to drive in any State of the Union without registering in that State, then it certainly also possesses the power to grant the same permission to native owners of cars.

In view of the fact that only few Americans would be benefited, and the further fact that some rather delicate questions of jurisdiction are involved, it is very questionable whether the United States Government will subscribe to the agreement drawn up at the convention, especially as probably no particular pressure will be brought urging it to do so.

But the removal of the barriers to auto traffic at national boundaries in Europe ought to be an object lesson to those of our State Governments which still refuse to recognize the auto licenses issued by their sister States. If these different nations, between whom there are no particular ties, are willing each to admit the motorists of the other on the strength of the licenses which these motorists have procured in their own country, how much more willing should our State Governments be to accord the same courtesy to motorists registered in neighboring States! With the rules of the road the same throughout the country there is no more danger of accidents being caused by non-resident than by resident motorists, and the chances of abuse of the privileges accorded by such mutual recognition of auto licenses are certainly less here than in Europe.

# The Increasing Popularity of the Six.

Among the many new models which are being announced for the coming season there appears to be an increasing proportion of six cylinder machines. While the four cylinder motor will evidently, as in past seasons, be by far the most popular type, there seems to be a growing class which demands the luxury which the six cylinder construction probably gives in its fullest measure.

Theoretically the more uniform torque and the almost equal balance of the six cylinder motor make it a far better type than the four cylinder. As the standard of workmanship in our shops has increased, and as ignition systems have become more reliable, the chief former objection to the six cylinder motor, i. e., the difficulty of getting all six cylinders to work in synchronism, has, to a large extent, disappeared. While these same conditions have made it possible for makers to turn out better four cylinder motors, the improvement in sixes has probably been more marked, and has no doubt had its influence in deciding some makers to enter upon their manufacture. There is no doubt but what the six cylinder motor

can be satisfactorily run at a somewhat lower speed than can the four; probably it is also capable of somewhat higher speeds than the four without excessive vibration, since the resultant inertia effects do not increase so rapidly as with fewer cylinders.

But this latter quality is of questionable value, as the four cylinder motor will run fast enough without undue vibration for any reasonable use. Indeed, as far as vibration effects on the occupants of the car are concerned, there is at the present time little, if any, advantage in using six rather than four cylinders, unless the motor is unusually powerful in relation to the weight of the vehicle.

The advantages of the six must then lie entirely in its greater flexibility. And by "flexibility" we mean both the range of speed and the promptness with which the speed can be changed. Just how great the advantages of the six are in this respect is evidently a matter which can only be decided by the users.

When six cylinder motors first began to make their appearance several seasons ago it was freely prophesied that they were a fad and would soon disappear from the market. But the same thing was said about the four cylinder motor when it first began to come into competition with the two cylinder opposed. The four cylinder has greatly increased its popularity in spite of these prophecies, and the same may be said, though in a lesser degree, of the six. The automobile industry is still young. Many think that we will use motors with fewer cylinders in years to come; perhaps they are right. On the other hand there is no particular reason for stopping at six cylinders-the eight cylinder V motor is somewhat smoother than the six, and so on.

Each cylinder we add makes the motor somewhat smoother running, and at the same time somewhat more complicated. There is only one authority who can finally decide the balance of advantages and disadvantages of the different types, and that is the user. Evidently enough users think that there are advantages in the six cylinder machine to create an increasing demand for that type, but, as we said before, the popularity of the four is in no apparent danger.

#### Questionable Value of Rumors.

There are always a great many rumors going the rounds as to the new constructions which are being tried by various prominent companies. Unfortunately, these rumors are often used by the smaller com-

panies as the basis for much of their experimental work. As a matter of fact, the large makers, whose output is sufficient to warrant their spending considerable money in research, are constantly trying all sorts of constructions, some of them very unpromising, in the hope of discovering something of value. These experimental constructions are often reported to have shown a great deal more merit than has actually been the case, and the smaller makers, acting on these reports, often engage in costly experimental work which is largely wasted.

This is by no means intended to discourage experimental work, for the new things which are developed from day to day in that way add much to the importance of the industry; it is written rather with a hope of increasing the amount of consideration given a problem before the actual work is commenced. Often only a rough analysis of the conditions is needed to show that it will be useless to start the work. It is our earnest belief that most of the money spent in experimental work could be utilized to better advantage if more time were given to a preliminary consideration of the problems presented. Too much attention should not be given to reports whose optimistic tone is perhaps intentional.

#### Quiet Shifting of Clash Gears.

The noise accompanying the meshing of gears has always been very properly regarded as an objection to the sliding gear system of speed changing. Objectionable as is the noise per se, its most serious aspect lies in the fact that it is the audible indication of severe stresses and wearing actions within the gear box, which may in time lead to failure of the gear set.

Noisy gear changes do not seem to be a defect of cars of cheap construction only, but are to be noted in connection with cars of the highest grade.

Probably the skill of the operator is the most important factor controlling this matter of noise in gear shifting, for it is observable that an experienced operator can usually make all changes with very little clashing, while a novice is likely to make very noisy changes, no matter what car he is attempting to drive.

An enormous number of cars, equipped with sliding gear sets, have been produced this year, and a large proportion of these has been delivered to owners who either are new drivers or who have previously driven cars with planetary gears. Quite a large proportion of these operators are

rather slow to acquire the skill necessary to avoid clashing, which is a matter of simultaneously judging car and engine speed. It is no wonder that a good deal of decidedly nerve racking gear clashing is heard at the present time.

While it is doubtful if the sliding gear system can be "foolproofed" to such a degree as entirely to overcome the effects of unskillful handling, quiet gear shifting may be greatly promoted by care in the design and construction of the gear set and its connected parts, and it is certain that the sliding gear system may be so arranged that the skillful operator shall have no trouble in making noiseless changes.

In the announcements of 1910 models many references will be found to this matter, and many claims will be noticed that gear clashing has been rendered impossible through improved construction, from which allusions it is evident that manufacturers are giving earnest attention to the question.

The recent development of machine tools for accurately and inexpensively beveling the abutting ends of the teeth is proving of great assistance to manufacturers in rendering their gears more readily meshable, the process of beveling having previously been mostly accomplished by hand in a somewhat inaccurate and very laborious manner.

Renewed interest seems also to be shown in the clutch brake, the employment of which renders decidedly easier the change from lower to higher gears, and this device is being adopted by some manufacturers who have hitherto not employed . Designers also are doing away with the diagging" which is a defect of certain topics of clutch, and which is a serious clut quiet gear shifting, and at the the reduction of the moment of mertis of the member of the clutch which is upon the gear shaft is being carried as far as practicable, in order that the speed of the idle parts may be readily and quickly alterable to the proper meshing value.

These improvements are of the greatest value in the elimination of gear clashing, but the education of the operator is essential before quietness of gear changing shall become universal. Perhaps the driver will educate himself in the school of experience in time, but a little more careful instruction on the part of the agent or salesman than is usually accorded would tend to hasten the acquirement of the necessary skill. This would tend to save the gears and to obviate one of the popular objections to cars.

# The Vanderbilt Cup Race

#### and the Wheatley Hills and Massapequa Sweepstakes.

Harry F. Grant, driving an American built Alco six cylinder, 60 horse power stock car, won the fifth annual race for the William K. Vanderbilt, Jr., Trophy, on the Hempstead Plains circuit, on Long Island, on Saturday, completing the 22 laps, equal to 278.08 miles, in 4 hours 25 minutes 42 seconds, at an average speed of 62.8 miles per hour. This is within two miles per hour of the stock car record of the world. Only five minutes behind Grant was Edward H. Parker in a four cylinder, 45 horse power Fiat, whose time was 4 hours 30 minutes 57 seconds. Up to the very finish of the race it was expected that Parker would be the winner. At the end of the nineteenth lap it appeared from the announced times that Chalmers-Detroit, No. 7. with "Billy" Knipper driving, was in the lead, leading Parker in the Fiat, No. 14, by about five minutes and the Alco, which appeared to be in third position, by about fourteen minutes. When the Chalmers-Detroit failed to put in an appearance on its twentieth round it was officially announced that the Fiat was then leading and that its time for twenty laps was 247 minutes 12 3-5 seconds. Several private clockers had observed that the official timers had failed to catch Grant on the eleventh

#### SUMMARY OF THE RACE.

#### CIRCUIT.

Location of circuit, Hempstead Plains, Long Island. Length of circuit, 12.64 miles. Road surfaces, concrete, macadam and dirt road.

#### VANDERBILT CUP RACE.

Entry Limitation, Stock Cars, Classes 1

Number	of laps22.
Total dis	tance278.08 miles.
Winning	driver
Winning	carAlco.
Winner's	time4h. 25m. 42s.
Average	speed62.8 m. p. h.

#### WHEATLEY HILLS SWEEPSTAKES.

Entry Limitation, Stock Cars, Class 3.

Number	of laps15.
Total dis	tance189.60 miles.
Winning	driver
Winning	carMarmon,
Winner's	time3h. 10m. 21 2-5s.
Average	speed59.8 m. p. h.

#### MASSAPEQUA SWEEPSTAKES.

Entry Limitations, Stock Cars, Class 4.

Number of	laps10.	
Total dista	nce126.40 miles.	
Winning d	riverJoe Matson.	
Winning o	ar Chalmers-Det	roit.
Winner's	lme2h. 9m. 52 2-	55.
Average e	need 50 41 m n h	

lap and set down his time for twelve laps as that for eleven laps. The time announced for Grant's tenth lap was 125 minutes 27 seconds, and for eleven laps 147 minutes 25 seconds, so that his time for this lap would have been 21 minutes 58 seconds. Grant made the next lap in II minutes I 2-5 seconds, or almost exactly one-half the time put down for his eleventh lap. When the matter was brought to the attention of Arthur N. Jervis, who was in charge of the Alco camp, he at once lodged a protest with William K. Vanderbilt, the referee. After a hurried consultation of the officials the protest was granted and the Alco was conceded one more lap than it had been credited with up to that time. Almost immediately after the protest had been allowed the Alco passed the grand stand and Starter Wagner gave Grant the signal for the "next to last" lap. This created much confusion in the grand stand and among the press representatives, most of whom had not yet heard of the protest and from the announcers' statements were under the impression that Grant had still two laps to complete.

If the fifth running of the race for the Vanderbilt Cup did not compare favorably with most of its predecessors, there are



SECTION OF THE COURSE, LOOKING TOWARDS HICKSVILLE.

a number of weighty reasons which account for the fact. In the first place, its entire character was changed this year; by the rules it was a national stock chassis event instead of an international racing car Derby, and the spice of patriotic sentiment was therefore lacking. Secondly, the date was set too late in the season for the race to be viewed by the spectators with any degree of comfort. The grand stand is evidently erected for summer use, with a roof designed to shield the occupants from the sun, but on Saturday a little sunshine was a real blessing, and those who had paid high prices for seats and boxes in the grand stand suffered more discomfort than those who camped in the open fields along the course. Finally, the time of preparation for the race was exceedingly short, the event having been definitely decided upon barely a month in advance, and the Motor Cups Holding Company, which conducted the race, was gaining its first experience, at least as an organized body.

In view of the late date the start of the races was set for 9 o'clock a. m., and this arrangement changed the entire aspect of the preliminaries to the race. Although all of the hotels in Garden City and the other towns along the course were crowded, there was little camping along the course during the night before the race that formed such a conspicuous feature of the previous Vanderbilt races. The night air toward the end of October is generally too chilly to make such an experience enjoyable and the late start rendered it unnecessary. But in the early morning hours the customary exodus to the race course started from New York and Brooklyn-by auto, by train, by carriage, and from the nearer points on foot. However, the attendance was by no means as large as during the past two years. It would be idle to speculate regarding the number of people



HARRY F. GRANT IN ALCO WINNING RACE. Showing the grand stand and pits.

who lined the course. The grand stand was approximately half filled at the time of the start, but many left it before the chief race was half completed, partly because the race itself was not sufficiently interesting and partly because of the chilly weather.

The start began promptly at 9 o'clock, the entrants in the two minor events being sent away first, at 15 seconds intervals. The contestants for the Massapequa sweepstakes contest were started beginning at 9 o'clock, those for the Wheatley Hills sweepstakes contest at 9:02 and those for the Vanderbilt Cup contest at 9:04. All of the entrants started with the exception of Willie Haupt, in the American, No. 2, who was prevented from taking part by an accident during practice on Friday morning

in which the crank shaft of his motor was broken.

Bert Dingley was replaced by "Billy Knipper as driver of the Chalmers-Detroit, No. 7. Dingley had an accident during practice one morning early in the week and received more or less severe personal injuries. He made a trial run on Friday morning, but found that he was not in condition to drive in the race, and Knipper was then assigned to his place.

The first car to complete the first lap was the Chalmers-Detroit, driven by Joe Matson, who started third. The second around was also a Chalmers-Detroit, that driven by W. R. Burns, who started first. The cars followed in quick successsion, and from that time on the bugle blasts announcing the approach of cars came at such frequent intervals that there were never any tedious waits. The best time in the first lap was made by Wishart (Mercedes), viz., 11m. 10s.; second best by Louis Chevrolet (Buick), viz., 11m. 21s., and third best by Joe Seymour (Isotta), viz., 11m. 30s. In the second lap Chevrolet obtained the lead. followed by Knipper in the Chalmers No. 7 and Wishart in the 1903 Gordon Bennett Cup winner, Mercedes.

The first car out of the race was the Simplex, driven by Mitchell. While on its third lap and in a position near the head the crank shaft of the motor broke and Mitchell was out of it. The accident occurred only a short distance east of the grand stand. It was Mitchell's first experience in road racing, and he was keenly disappointed at his early elimination.

The spectators in the vicinity of the grand stand had their first thrill when S. E. Wishard, in the Mercedes No. 16, overtook the Marmon No. 32 at the end of the fourth lap in front of the grand stand. A moment later a wave of enthusiasm was set in motion by the announcement that Louis Chevrolet (Buick No. 15) had covered his



START, VANDERBILT CUP RACE.

lap in 9 minutes 57 seconds. This if to a speed of 76 miles per hour.

31, the Marion entry in the Wheatley Sweepstakes, stopped at the end of its p at the pits in front of the grand owing to some trouble with the monich took 9 minutes to correct. E. A. e., the amateur driver of Fiat No. 4. If at the pits at the end of his second I was detained 4 minutes with engine

5 minutes to 10 the Atlas entry No. the Fiat No. 14 raced by the grand "neck to neck," the Atlas seemingly g its own quite well. This machine always be recognized as it approached ess stand before it could be seen by uliar exhaust noise. The exhausts of the cylinder two cycle engine came so ogether as to produce one continuous g noise in which one explosion could distinguished from the other. The carents the firm's first attempt in road

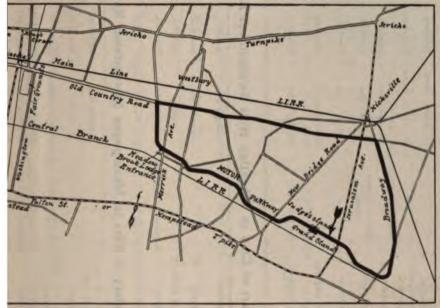


PARKING SPACE NEAR GRAND STAND.

A little later came the report that the Buick No. 15, driven by Louis Chevrolet, had ing point and viewed the rest of the race from the Buick pit.

At the end of the tenth lap the race seemed to lie between the two Chalmers-Detroit "Bluebirds," Nos. 7 and 9. No. 7's time for ten laps was 113 minutes 52 seconds, and No. 9's 114 minutes 36 seconds. Their nearest competitor at that stage of the race was the Apperson No. 6, driven by Hugh N. Harding, whose time for ten laps was 119 minutes 37 3-5 seconds; then came the National No. 11, driven by Charles C. Merz, and the Alco, driven by Grant. A short time later came the report that the Apperson No. 6 had turned over at Massapequa Lodge, but that no one was hurt, and the latter part of the report received confirmation later on by Harding appearing at the starting point.

No. 7, the leading Chalmers-Detroit, stopped at the pit at 11:15, at the end of its twelfth lap, and renewed both rear tires. A peculiar device was used for raising one end of the car instantly. It consists of a steel bar bent into such form that its two ends may be inserted under the ends of the axle and then by pulling down on the middle of the bar the end of the car is



blown out a cylinder at Middlebrook and was out. Chevrolet returned to the start-

and made a very good impression. is Strang had a thrilling experience the second lap. While driving at full at Meadowbrook a stone that had been n on the course by a spectator boundand struck his radiator, causing a Strang continued to the end of this d stopped at the pit, where an examiof the car revealed a broken steeruckle, which forced him to withdraw. Moon No. 34 stopped at the end of irth lap at the pit and put on a new of spare covers. It had been running consistently up to this time, covering st two laps in about 15 minutes each, e next two in about 14 minutes each. e later the Isotta No. 17, driven by eymour, was pushed off the course at rand stand with a broken steering It had completed six laps,

Marmon No. 12, driven by Harry Stillwas reported out of the race at 10:30 a broken steering knuckle. Stillman ampleted five laps in 63:34 2-5, which ponds to a speed of 60 miles per hour.



E. H. PARKER IN FIAT AT WESTBURY.

Particulars of Cars in Vanderbilt Cup Race.

-		-	-	Cu. It	ä						-	-	-		
~ ~	Da.	9. <u>r.</u>	e. Stro	Rated No. Bore. Stroke. Distriction	Valve Arrangement.	Ignition.	Remarks.	Clutch.	Transmis- No. sion Type. Speeds	No. Speeds	Final Drive.	Wheel Base. Inches.	Tires. Sizes.	Mako.	Remarks.
4	1-Fiat 47*	4 5.45	45 5.08		In head.	L. T. magneto.	Single rocker valve	Multiple disc.	Selective.	;   <b>▼</b> 	Chain.†	126			
٠	2-American 60-70	4 5.75	75 5.5	573	On both sides.	Bosch magneto.	Did not start.	Internal expanding.	Selective.	•	Shaft.	110	880 X 120	Michelin.	
8	3-Simplex 50	5.3	5.75 5.7	5.75 600	On both sides,	Bosch magneto.	•	Multiple disc.	Selective.	4	Chain.	134	880 x 130	Michelin.	
4	4-Fiat 47*	4 140 n	ım. 130	4 140 mm. 130 mm. 470	In bead.	L. T. magneto.	Single rocker valve	Multiple disc.	Selective.	4	Chain.	117	34 x 4%		
•		<b>4</b>	s	380	3 post.	Atwater Kent batterics.	Ļ	Internal expanding.	Selective.	n	Shaft.	123	36 x 4	Fiek.	Fisk rims.
4	6—Apperson 49	\$.3	5.75 5.7	5.75 600	On both sides.	Bosch magneto.		Multiple disc.	Selective.	8	Chain.	911	880 x 120	Michelin.	
4	7—Chalmers 40	<b>4</b> R	4.75	75 363	On same side.	Bosch magneto, coils and batteries.		Cone, leather faced.	Selective.	•	Shaft.	12	930 X 113	Michelin.	
۰ō	8—Alco 60	6 4.7	7 5.47	17 565	On both sides.	Bosch magneto.	٠	Disc clutch.	Selective.	*	Chaiu.	126	<b>4</b>	Michelin.	
*	9-Chalmers 40	<b>4</b> 80	. 4.75	,5 363	On same side.	Bosch magneto, cons and batteries.		Cone, leather faced.	Selective.	<b>m</b>	Shaft.	122	930 X 113	Michelin.	
10-National 40	<u>o</u>	4 5.0		5.0 380	On both sides.	Bosch magneto, coils and batteries.		Cone, leather faced.	Selective.	n	Shaft.	124	30 x 4		
4	11-National 40	4 5.0	8.0	380	On both sides.	Bosch magneto, coils and batteries.		Cone, leather faced.	Selective.	m	Shaft.	721	34 x 478		
•	12-Marmon 32*	4 4:5	2.0	316	On both sides.	Bosch magneto.		Multiple disc.	Selective.	m	Shaft.	911	880 X 130	Michelin.	Full elliptic springs rear.
Ť	14-Fiat 40	130	140	448	On both sides.	L. T. magneto.	Governed spark timer.	Multiple disc.	Selective.	4	Chain.	136	920 X 120	Michelin.	
ñ	15—Buick 30	4.8		316	In head.	Remy magneto.		Leather cone.	Selective.	ю	Shaft.		30 X 113	Michelin.	
16—Mercedes 60	ç	4 51 54.	5 6.25	580	Inlet head, ex- haust side.	Bosch L. T. magneto.		Mercedes coil.	Selective. 4	<b>,</b>	Chain.	:	38 X 4 910 X 90 910 X 130	Micbelin.	Lug rims.
Ś	17—Isotta 51*	4 5.67	57 4.70	0 475	On both sides.	Eisemann magneto.	No fan used.	Multiple disc.	Selective.		Chain.	117	875 x 105 front	Michelin.	Lug rims.
2	A. L. A. M. rating.	5	† Direct	† Direct on third.	÷							•	000 k 120 read		ı

Race.
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Particul

31-Marion 32.5 4 4.5 4.5 284 On same side.	•	4:5	÷:	<b>384</b>	On same side.	Magneto.		Multiple disc.	Selective.	_	3 Shaft.	=	880 X 112 34 X 4	Michelin.	Lug rima.
32-Marmon 32 4 4.5 4.5 284 On both sides.	•	4.5	÷:	<b>38</b>	On both sides.	Magneto.		Multiple disc.	Selective.	~	Shaft.	911	880 X 120	Michelin.	
3;-Columbia 32.5° 4 4.5 4.7 298 On both sides. Low tension magneto.	4	4.5	4.7	862	On both sides.	Low tension magneto.		Cone.	Selective.	•	Shaft.	115	34 A 4.78 880 X 120	Michelin.	
34Moon 30 4 4.5 4.5 384 In head.	4	<b>+</b> ·\$	4:5	<b>3</b> 84	In head.	Magneto.	Overhead cam shaft.	Multiple disc.	Selective.	•	Shaft.	112	860 x 112	Michelin.	Lug rims.
												ļ			

# Particulars of Cars in Massapequa Sweepstakes Race.

41-Chalmers 45 4 4.5 227 Iniet head, ex. Magneto and banat side, tery and coil	4	Þ	5.	4.	Inlet head, ex- haust side,	Magneto and bat- tery and coil.		Multiple disc.	Selective.		Shaft.	100	880 x yu.	Michelin.	
43-Hudson 20	*	4 3.75 4.5 198	4.5	198	On same side.	Magneto.		Cone.	Selective.		Shaft.	100	32 × 3%	Michelin.	Lug rims.
43-Chalmers 25 4 4.0 4.5 227	•	0.4	4. R	327	Inlet head, ex- haust side.	nlet head, ex. Magneto, coil and haust side. battery.		Multiple disc.	Selective.	m	Shaft.	1.15	880 x yo	Michelin.	
44-Maxwell 25 4 3.964 4.5 210	4	3.964	4·s	910	On both sides,	Magneto.	Thermo-siphon circ.	Multiple disc.?	Progressive.	۳.	Shaft.	9	7 % 72	Ajax.	
45 Maxwell 22	4	3.75	4.25	4 3.75 4.25 188	On both sides,	Magneto.	Thermo-siphon circ.	Multiple disc.t	Progressive.	•	Shaft.	93	30 x 31/6	Ajax.	
46-Maxwell 22 4 3.75 4.25 188 On both sides,	•	3.75	4.25	188	On both sides.	Magneto.	Thermo-siphon circ.	Multiple disc.t	Progressive.	•	3haft.	03	10 H 11/5	Alex.	

Start, Car. Driver.	N	0			Van	lerbil	t Rad	T-a	Vanderbilt Race-Twenty-two Laps.	r-two	Laps	4									
3-SimplexMitchell 12:31	23:18	Out	4	10																	
4-Fiat	34:00	92:19	77:40	Out.	0	-	0	0	01	=	12	13	4-	16							
5-Atlas	29:37	47:43	55:46	60:69	81:45	94:29 108:55		21:47	121:47 158:48 201:14		225:07	246:37	246:37 259:40 273:00	273:00							
6-Apperson Harding 11:53 2	23:34	35:14	19:91	58:24	95:69	81:29 96:16	91:96	08:04	108:04 119:37 Out.	Out.					16	16 17	18	19	20	21	22
7-Chalmers Knipper 11:36 2	22:33	34:23	45:56	57:20	68:42	79:55	91:13	02:32	113:52	125:21	140:14	151:37	163:18	174:55	188:33	102:32 113:52 125:21 140:14 151:37 163:18 174:55 188:33 201:26 213:38		230:43			
8-AlcoGrant 13:18 2	24:50	36:10	47:18	62:03	73:23	86:16 103:29		14:31	114:31 125:27 136:25	136:25	147:25	158:26	175:26	147:25 158:26 175:26 186:29		197:32 208:37 222:37	222:37	233:26 244:10 255:09	244:10 3		265:42
9-ChalmersLorimer 12:01 2	23:37	35:07	46:38	58:02	21169	80.30	1 :49 1	03:15	91:49 103:15 114:36 125:49 137:07	125:49		Out.									
10-NationalAitken 11:46 2	23:59	35:46	46:37	Out,																	
11-National	24:06	36:01 48:04		90:09	61:22	94:30	96:45	\$1:60	84:30 96:45 109:14 123:16 135:42 148:32	135142	148:32	Out.									
(2-MarmonStillman 12:11 2	24:58	300	\$0:48	63:34	77:56 1	135:31 Out.	out.														
14-Fiat Parker 18:43 3	31:03	43:08	55:07	67:12	78:59	1 15:06	29:20	14:38	126:39	138:43	150:41	162:41	174:46	186:56	20:661	81:112 19:38 196:39 138:43 150:41 162:41 174:46 186:56 199:07 211:18	223:21	223:21 235:18 247:12 259:07	247:12 2		270:58
t5-Buiek Chevrolet 11:21 2	22:30	33:30	43:27	Out.																	
16-MercedesWishart 11:10 2	22:33	33:45	44:55	20:95	62:49	1 40:58	33:17	45:06	156:40	170:15	200:54	212:21	223:58	236:10	248:56	85:04 133:17 145:06 156:40 170:15 200:54 212:21 223:58 236:10 248:56 259:52 274:04	274:04				
17-IsottaSeymour 11:30 22:49	22149	33:46	45:16	56:42	Out.						, 1										
						Nor	E.—Fra	tions of	NoreFractions of seconds omitted	omitted											

raised and the device serves as a prop. In this case, however, the car had been driven very close to the curb, and as the device lifts the wheels only very slightly off the ground it was impossible to get the near tire off until that side of the car had been further raised by means of an ordinary jack.

At the end of the thirteenth round the field in the Vanderbilt Cup race had been reduced to five contestants. The Chalmers-Detroit No. 9 blew out a cylinder between Westbury and Middlebrook on its thirteenth round. The National No. 11 also failed to complete its thirteenth round. The other National, No. 10, had lost a wheel at Middlebrook early in the race, but the fact was not announced at the grand stand until the leaders had completed five laps.

At 15 minutes to 12 the Atlas, at the end of its tenth lap, stopped at the pits and took on fuel, oil and water. The exhaust of this car, which is very characteristic when the motor is working under full load, is equally so when it is throttled down. The charge distribution then appears to be more or less irregular, and misfires alternate with explosions of considerably varying force, to judge by the noise of the exhausts. At the same time as the Atlas the Alco made a stop at the pit and put new tires on one front and one rear wheel. The demeanor of Grant during these stops at the pits differed considerably from that of the other drivers. He appeared to be absolutely cool, calm and collected, not at all in a hurry, and at his first stop for supplies some of the spectators got the impression that he was about to retire, so entirely devoid of any suggestion of rush were his movements, but when he passed the grand stand on his next lap it was quite apparent that he was still very much in the race.

At 12 o'clock No. 7, the Chalmers-Detroit, driven by Knipper, stopped at the pit to change a front tire. It had completed fifteen rounds at an average speed well below 12 minutes to the round, and had apparently a safe lead over its nearest competitor. In the rush to get off again it was forgotten to remove the special jacking device above alluded to, and had not some bystanders called the driver's attention to the oversight just as he was ready to let in the clutch the car would probably have moved off with the front on a sort of sleigh runner.

At 12:35 it was reported that the Knox No. 5, driven by Elmer Knox, was off the road at Hicksville, and it was then feared that this car, which had been running quite consistently during the first part of the race. though its speed was not quite high enough to give it a chance for the cup, might be out of the running. These fears were dispelled when the car came by the grand stand again on the completion of its tenth lap, for which it required 47 minutes.

The Alco made another stop for tires at 12:35, and a couple of minutes later the leading Chalmers-Detroit, No. 7, drew up to the pit again to replenish its supplies of fuel and oil. Time was now precious. The Fiat No. 14, second in the race so far as

#### Wheatley Hills Sweepstakes-Fifteen Laps.

No. Car. Driver. 1 31-MarionMunson 33:16	2 65:37	3 108:15	4 142:13	5 174:29	6 193:20	7 216:35	8 240:32			11	12	13	14	15
32-Marmon	25:04	37:31	50:09	62:49	75:11	87:17	100:12	112:17	125:14	138:07	150:48	163:49	176:52	190:35
33-ColumbiaWilcox 15:29	29:11	43117	57107	70:50	85:06	98:46	112:16	130:51	149:51	162:30	176:36	Our.		
34-Moon	30:08	44:11	58:06	76:03	91:20	Out.								
			Note.	-Fractio	ns of sec	onds on	itted.							

then known, was only to minutes behind, and four laps still remained to be run. In a few minutes Knipper was off again. At this time five cars in the Vanderbilt Cup race were still on the course, namely, the Chalmers-Detroit No. 7, the Fiat No. 14, the Alco No. 8, the Mercedes No. 16 and the Knox No. 5. As the times were announced the contestants then followed one another in the order given, but making correction for the losing of one lap of the Alco by the

those most interested, and not the least among the photographers who had their cameras set in preparation for snapping the finish of the winner. Parker's time for the twenty-two laps was 4 hours 30 minutes 57 seconds. Immediately upon the completion of Parker's last lap the race was called off. Of the Vanderbilt contestants S. E. Wishart (Mercedes) and Elmer Knox (Knox) were still running.

Practically the whole interest of the



KNIPPER IN CHALMERS.

scorers the latter was already in second position. Knipper completed his nineteenth round in 2:30:43, and then was not seen again, nor was anything heard regarding the cause of his disappearance until the finish of the race. It was then learned that he was detained by a burnt out bearing, due either to an air lock in the oiler or to failure to replenish the oil supply in time.

The Alco protest and its allowance caused a big surprise to everybody and a great deal of confusion reigned for a while among crowds was monopolized by the big cars contending for the Vanderbilt Cup, and the finishes of the winners in the Wheatley Hills Sweepstakes and the Massapequa Sweepstakes were hardly taken notice of. Nevertheless, these cars, considering their limited cylinder capacity, achieved very high speeds, and what is more, there were proportionately fewer retirements among the contestants in these classes. Of the four cars competing for the Wheatley Hills Sweepstakes the Marmon was easily the

fastest, requiring about 12½ minutes to the lap, and as it ran with the regularity of clockwork it was an easy winner. The Columbia also ran well, but it required a shade less than 15 minutes to the lap. The Moon, No. 34, seemed to be the equal of the Columbia in speed, but it disappeared after completing six laps. The Marion spent considerable time in stops at the pits and completed only nine laps, although it was still running at the time the race was stopped.

For the Massapequa Sweepstakes there were six contestants, two Chalmers-Detroits, three Maxwells and one Hudson. All but the Maxwell, driven by Thomas Costello, and the Chalmers-Detroit, driven by B. Brown, finished this race. The event was won by Joe Matson, the Chalmers-Detroit driver, who won his first laurels in the Crown Point-Lowell race last June by winning the Indiana Trophy. His time for the ten laps was 2 hours 9 minutes 52 2-5 seconds. Matson drove a fine race from the time he was sent off by the starter to his crossing of the finish line. Second place was secured by Martin Doorley, driver of the 22 horse power Maxwell. No. 46, and third place by another Maxwell, No. 44, driven by Arthur See. The times of the two Maxwells were only about two minutes apart. The fourth car to finish in this race was the Hudson, No. 42, driven by George Ainsley, which made the excellent time of 2 hours 31 minutes 47 2-5 seconds.

The races were notable for the absence of all serious personal accidents, and the material damages to cars were also slight

Among the notable occupants of the grand stand were John D. Rockefeller and Sir Thomas Lipton.

Sharing in the honors of the race with the manufacturers of the winning cars are the Michelin Tire Company, of Milltown, N. J., whose tires were found on all of the winners, and the Bosch Magneto Company, of New York, with whose magnetos each of the three winning cars was equipped.

Massapequa Sweepstakes-	len	Laps.
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		· · · · · · · · · · · · · · · · · · ·	cdnn	- neep	Bettered		week bar					
	No. Car.	DriverBrown	1 14:32	28:01	3 41:38	55:08	5 68:38	81:15	7 96:01	8 109:39	9 121:39	10 Out
4	-Hudson	G. Ainslie	14:17	25:27	41:16	57:08	72:57	88:42	105:36	120:19	136:02	151148
4	3-Chalmers	Matson	13	25:42	38:28	51126	64136	77:43	90:47	103:47	116:53	119152
4	4-Maxwell	See	15:02	29:50	44:39	59:38	74:31	89:30	104:39	119:50	135:06	150124
4	s-Maxwell		12:36	Out.								
3	6-Maxwell	Doorley	14:56	32:08	46:48	61:16	75:53	90130	105:04	119:26	133:59	148148
- 0			Nore-	Fractions	of second	e omitted						



MARMON, WINNER OF WHEATLEY HILLS SWEEPSTAKES, AT WESTBURY.

#### ome Observations Along the Course.

point which was noticeable on the of the course outside of the Parkway he lack of large congregations of specat a given point. From the Hicksurn back almost to Central Park, the tors and the parked cars got thinner hinner, until the sight of a parked ot to be a rarity. Parking spaces d to almost go a-begging, some being for as low as one and two dollars. s were almost entirely absent. Even Hicksville turn, which was in the of the village and which was one sharpest on the course, the congesvas only moderate. At this point and Westbury turn the road was banked two to three feet high. However. of the drivers took these turns very vatively, so much so that the banking d entirely unnecessary. From the ville turn for about a half a mile along the back stretch or old country so called, the spectators and the d cars were fairly thick, but they ally thinned out from this point. One noticeable feature was the number of which were parked well back in the and on crossroads, where probably or no rent was charged.

side of the Parkway the congestion probably greatest from the intersecf the Merrick road with the course Westbury turn. At both these points ourse was well policed. This point ill as Hicksville was rounded with n by most of the drivers. At the on of the Merrick road and the course slight left and right jog at which of the drivers slowed up. From this to the turn there was a slight up of 2 or 3 per cent, which helped to he speed down. It was evident from ay that the crowd congregated that they wanted to see was the high made on the straights rather than e accidents at turns. During the p the machines showed a tendency bunched in the vicinity of the Hicksurn. In many cases two or three

machines would pass this point not more than fifty yards or so apart. Many of the spectators along this part of the course kept their score cards religiously, and without an exception these all agreed that Grant, in the Alco, was in the lead. On his second round, just before reaching the Hicksville turn, Knox, with his Atlas, stopped for some sort of engine trouble, probably dirty plugs, for as soon as this was fixed the engine started up readily and ran with great smoothness. This machine aroused considerable interest along the course and called forth much favorable comment on account of its performance, considering that it was comparatively untried. The sound of the motor was a continuous roar, and could readily be distinguished by most of the spectators before it came in sight. A comment which was freely heard along the course was that with a higher gear the performance would probably have been much better.

On his seventh round Grant, with his Alco, had a flat left rear tire at about the centre of the backstretch. This drew quite a crowd, as most everybody was interested to see a tire change made. The methods of carrying the tools very much facilitated

the change. The jack was carried in an upright position on the upper part of the footboard, the base being held in a Cshaped flat piece of metal attached to the horizontal part of the footboard, it being retained in position by a latch at the left hand. The mechanic had this in his hand ready to use before the car was brought to a standstill. While he was jacking up the wheel Grant took the brace from the footboard, where it was held in safety clips and used the same to expand the rim. As soon as he had the wheel jacked up the mechanic got a spare tire ready to replace the injured one. In the case of the Alco this was easy, as they were in a sort of a basket in the rear, without any straps to be unbuckled and buckled again. He then assisted in the removal of the old rim, and the replacement of the new rim on the wheel. While Grant was using the brace to contract the new rim on the wheel he replaced the injured tire in the carrier, removed and replaced the jack on the running board and was ready to start the motor. The whole operation did not take over a minute and a half. The steadiness of running and the consistency of the Alco were remarked upon by almost everybody. One noteworthy feature was that most of the spectators seemed to be pretty well informed about the details of the cars and discussed their performance with considerable intelligence; in fact, they looked on the technical side rather than the sporting side.

The Maxwell, No. 45, in the Massapequa Trophy race was out on its second round owing to loss of cooling water through a leaky water pipe. Lorimer's No. 9, Chalmers, just before entering the Parkway on its thirteenth round broke the retaining lugs which held the rear pair of cylinders to the crank case. The bolts between the two cylinders, on both sides, were pulled bodily out of the casing, and the webbing between the cranks was badly broken.

A rather curious accident happened to Columbia, No. 33. A small hole was made in the lower part of the rear crank case



MAXWELL No. 44 AT HICKSVILLE.



JOE MATSON (CHALMERS), WINNER OF THE MASSAPEQUA SWEEPSTAKES.

on the right hand side, and caused a loss of oil. Just how this was made is not quite certain, but it was thought that a stone was picked up by the flywheel, which was not protected by a dust pan, and worked in between the flywheel and crank case. The loss of oil was made good to a certain extent by the mechanic, who kept pumping constantly with his hand pump.

The Moon car broke its overhead cam shaft in two places between the second and third cylinders.

The Chalmers team had a score board about a quarter of a mile from the Meadowbrook entrance to the parkway, where the position on the last lap was announced by large numbers. This information was received direct from the grand stand by telephone. The number of the car was placed on top, then the lap, and below this the position. There were, of course, places for the announcement of four cars. The numbers were about 1 foot high.

A rather interesting detail was the fact that a large number of the cars were equipped with speedometers, which were used both in practice and in the race itself.

Among those in charge of the racing crews, Harry L. Bill, of the Chalmers-Detroit Motor Company and Arthur N. Jervis, of the American Locomotive Automobile Company, deserve particular mention for the efficient way in which they kept their respective drivers informed of their position in the race. Mr. Jervis also deserves credit for the effective manner in which he backed up his protest concerning the losing of one of Grant's laps by the scorers. At first the officials paid little attention to Mr. Jervis's complaint, but his persistence at last induced them to look into the matter, with the result that his efforts were rewarded, and Grant was declared the winner.

Among the prominent tradesmen noticed at the race by the representatives of The Horseless Age were the following: H. W. Chapin, W. S. Gorton, Benjamin Briscoe, Howard Marmon, C. M. Hall, Capt. Wm. Mitchell Lewis, Fred I. Tone, Elmer Apperson, Hugh Chalmers, Howard E. Coffin, H. W. Nuckols, Hauvette Michelin, J. C. Matlack, Horace De Lisser, Wm. E. Metz-

ger, A. C. Newby, L. J. Bergdoll, J. M. Gilbert, Harry Fosdick, N. E. Parish, Thos. J. Wetzel, D. J. Post, L. D. Rockwell, Thomas Miracle Forbes, E. R. Hollander,, A. G. Hoffman, E. V. Hartford and E. H. Broadwell.

At a meeting on Monday of the executive committee of the Motor Cups Holding Company, Mr. Vanderbilt, as referee of the event, reported that he had awarded the Vanderbilt Cup to the Alco, No. 8, driven by Harry F. Grant, and entered by the American Locomotive Company; the Wheatley Hills Trophy and \$1,000 cash to the Marmon car, No. 32, driven by R. W. Harroun, and entered by the Nordyke-Marmon Company; the Massapequa Trophy and \$1,000 cash to the Chalmers-Detroit "30." No. 43, driven by Joe Matson, and entered by the Chalmers-Detroit Motor Company. Mr. Vanderbilt further reported that the Fiat, No. 14, entered in Class I, was placed second, and that the Atlas, No. 5, and the Chalmers-Detroit "40" were still running when he declared the race off and that no award was made in Class 2. The referee further stated that a statement had been made and signed by the official timers and scorers to the effect that they had omitted to score one lap for the Alco, No. 8. Mr. Vanderbilt also reported that no protests had been filed.

A protest was lodged with the Motor Cups Holding Company following the publication of Mr. Vanderbilt's announcement, however, by the Atlas Motor Car Company, concerning the decision that no award should be made in Class 2 of the Vanderbilt Cup entries. The Atlas Company lay claim to first position in this class and to the award of the prize offered.

The following table gives the results of the four previous races for the Vanderbilt Cup, all of which were run on Long Island:

1904—Panhard (Heath), 302.4 miles; average speed, 52.2.

1905—Darracq (Hemery), 280.30 miles; average speed, 61.49.

1906—Darracq (Wagner), 290.70 miles; average speed, 61.43.

1908-Locomobile (Robertson), 258.06 miles; average speed, 64.38

#### Off for Atlanta.

A party of racing drivers in charge of Fred J. Wagner left New York over the Seaboard Air Line at midnight Wednesday for Atlanta, Ga. The party, which traveled in two special cars, comprises many of the drivers in the recent Vanderbilt Cup race. A. R. Pardington, second vice president and general manager of the Long Island Motor Parkway, will act as referee of the Atlanta races, and S. A. Miles and Alfred Reeves will act as judges. The Warner timing apparatus, in charge of C. H. Warner and A. J. Interrieden, will be used for timing.

# Manufacturers' Attitude Toward

In connection with the inquiry made by the Automobile Club of France among leading European manufacturers, as to whether they would take part in the Grand Prix race in 1910, it is learned that the firms of Panhard-Levassor, Renault, Brasier, Lorraine-Dietrich, Mercedes, Fiat, Napier, Peugeot, Berliet, Germain and Motobloc maintain an antagonistic attitude toward the race. Darracq suggests a convention of manufacturers and will abide by its decision. Benz will be guided by the decision of other German manufacturers, but has already engaged a number of well known drivers, including Hemery. The following firms are thought to be almost certain to take part in the race: France-De Dion-Bouton, Sizaire-Naudin, Delage, Gregoire, Cottin-Desgouttes, Rolland-Pillain, Corre-La Licorne, Rossel, Westinghouse and Lion-Peugeot; Italy-Spa; Austria-Laurin-Klement; Great Britain-Daimler and Vauxhall; Spain-Hispano-Suiza; United States-Simplex.

#### Butler to Succeed Hower (?).

It is generally understood that Chairman F. B. Hower of the A. A. A. contest committee will resign at the expiration of his present term, and that the officials of the association have been looking for a suitable successor. The name of Secretary S. M. Butler of the Automobile Club of America has been mentioned a number of times in connection with the position, and according to the latest reports Mr. Butler's appointment has been practically decided upon. This choice must be regarded as a very happy one. Mr. Butler has been managing the affairs of the Automobile Club of America since its organization, and has therefore had a great deal of experience in the line of work that falls within the province of the chairman of the A. A. A. contest committee. He is very popular in automobile circles in and around New York.

Plans are on foot for the manufacture of automobiles at the plant of the McGuire-Cummings Manufacturing Company in Paris, Ill. Cars are to be assembled from parts bought in the market.

#### The Phenomenon of Muffler Explosions.

BY ALBERT L. CLOUGH.

The complaint was recently made by the owner of a high grade, six cylinder car that it was very likely to explode most vehemently in the muffler, to the terror of all persons and horses within earshot, when the motor was started. A little inquiry elicited the fact that several other owners of six cylinder cars suffered rather frequently from this annoyance. Whether six cylinder cars are any more liable than fours to muffler explosions can hardly be stated with any kind of assurance, but there seems to be an impression current to that effect. The cars referred to above being all of the same make, it is not safe to draw any such conclusion from the data at hand.

#### A CASE OF IMMUNITY.

When one considers the subject one is likely to be rather surprised, not that these explosions sometimes occur, but that they do not occur oftener. The four cylinder motor on the car which the writer drives can be cranked over indefinitely, with the throttle say a quarter open and the spark cut off, and still there will be no muffler explosion when the ignition is immediately thereafter thrown on and the engine starts on the spark. One might think that the exhaust manifold, the exhaust pipe and the muffler would be filled with gas after such a procedure and that the first explosion in a cylinder would send a flame into the manifold and fire the gas therein. This does not happen, however, although the carburetor may be heavily flooded before cranking.

The same motor is habitually used as a brake for considerable periods when the car is running down hill, the throttle being set in the idling position and the spark shut off, but a muffler explosion has never taken place when the ignition was switched on, although one would expect the exhaust system to be completely filled with gas of the same quality that the engine "idles on" and on which it will even carry the car at a low speed on the level.

A number of times the experiment has been tried of opening the throttle wide while the engine was acting as a brake and then throwing on the magneto while the throttle was thus open, but no muffler explosion has resulted. This was tried with the ignition early and as late as the magneto afforded.

## CONDITIONS NECESSARY FOR A MUFFLER EXPLOSION.

It is pretty obvious that, in order to obtain an explosion in the exhaust system, the gas in the manifold must be in an explosive condition and that it should be reached by gas from the engine at a temperature above its point of inflammation. The richness of the gas entering the exhaust system when an engine is cranked is usually not very great, as the speed is low. Still it is rich enough to fire promptly in the cylinder which is within spark range,

although this cylinder is under only very light compression. Is the fact that the gas in the cylinder is slightly compressed, while that in the manifold is not, the determining factor?

It seems altogether more likely that the reason why no explosion occurs is that no flame passes the exhaust valwe of the cylinder which starts upon the spark, at the piston speed attained by the explosion which starts the motor, or even by cranking; the period between ignition and exhaust valve opening is probably long enough to cool down the burning charge below the temperature of ignition before it leaves the cylinder. The cylinder wall, furthermore, is in a cool condition.

It is not plain, however, why there is no muffler explosion in the case of a running engine with wide open throttle and the ignition suddenly switched on, as mentioned above. One would expect that flame would pass the exhaust valve and fire the gas promptly, and it is a fact that this actually occurs with many motors at times.

It is reasonable to suppose that a late spark, early exhaust release, hot cylinders and a rich mixture, or perhaps, one should say, a slow burning mixture, are conditions which favor these explosions.

Just what part, if any, the tightness of a muffler or its construction in general plays in this connection may be worthy of consideration.

#### AFTER STOPPING MOTOR.

When a motor is stopped by throwing off the switch, the throttle is generally opened quite widely and the motor usually makes quite a number of revolutions before it stops. This must leave the exhaust system full of unburnt gas. A gasoline mixture is somewhat more dense than air at the same temperature, and the muffler is usually lower than the exhaust manifold. Is there, on this account, a tendency for pure air to replace the gas in the system by a sort of "hydrostatic action," assisted by the ordinary effects of diffusion? If this is the case, does the exhaust system become purged of gas or the richness of the mixture become greatly reduced after it has been stopped for some time? In the case of the six cylinder car referred to in the beginning of this article muffler explosions have occurred after the motor has been still for quite a few minutes when the motor was "sparked" up. This particular car and others of the same make are not very economical of gasoline and seem to operate with rather rich mixtures.

There is a difference in the action of a four and six cylinder motor which may have some bearing upon their relative liability to muffler explosions.

#### IN FOUR CYLINDER MOTORS.

When a four cylinder motor is "sparked up" the exhaust valve of the cylinder which should have fired just before the one which starts the motor is open and has been open during the time that the motor has been at rest. The explosive charge in its cylinder has thus escaped to the exhaust manifold and may have been diluted by the process above spoken of. The exhaust valves of the other two cylinders are closed at the time of the opening of the exhaust of the firing cylinder.

#### IN SIX CYLINDER MOTORS.

With the six, the conditions are somewhat different, as two, cylinders are at times performing their corresponding strokes of the cycle simultaneously. Two cylinders are thus upon the firing stroke at the same time during four periods, which aggregate about one-third of the entire cycle. A motor of this type, although it may stop at almost any portion of the cycle, when the switch is thrown off, is pretty likely to come to rest during one of the six periods in the cycle when but one cylinder is performing compression. At such a point two cylinders are on the working stroke, the first cylinder in firing order being pretty well down on this stroke and the second cylinder in firing order being in the earlier portion of its working stroke. If the spark is set somewhat late it will be too late to fire the first of these two cylinders, but is likely to "catch" the second one and ignite it. Very shortly after this second cylinder explodes and before it has finished its stroke the exhaust of the first cylinder opens and discharges its unburnt charge into the manifold. While it is still doing so the exhaust of the cylinder which is firing opens, and, if the temperafure of the issuing gases is sufficient, the fresh charge from the first cylinder, possibly under a little pressure, may be ignited and its explosion may detonate the gases in the muffler even if they are rather too poor for ordinary ignition to effect their combustion. The same conditions prevail when the car is cranked. The cylinder which should have fired just before the one which actually fires first pours its charge into the manifold during and after the power stroke of the firing cylinder and is discharging unburnt gas when the exhaust at the firing cylinder opens.

Whether this difference in the action of the two types of motor renders the six more liable to muffler explosions is a "conundrum." It may be that this entire matter of muffler explosions is a simpler one than it has been made to appear here, and they are caused by "choked up" mufflers, an excessive richness of the charge at stopping, by unduly delayed combustion in the starting cylinder and similar causes. It is a fact that some chauffeurs leave their cut-outs open when about to start in order to avoid them.

This remedy is, however, productive of nearly as much noise as the phenomenon it is intended to avert.

About 60 miles of good roads have been built in Michigan since July 1 by forty-six counties.

#### International Road Traffic Agreement.

The International Road Traffic Convenvention, in Paris, completed its labors on October 11, the last session being attended by the French Minister of Public Works. Millerand, who in a brief address complimented the delegates and the Governments they represented on the results achieved. The following agreement was made, which was immediately signed by the representatives of France, Germany, Italy, Belgium, Bulgaria, Servia, Roumania, Montenegro and Monaco. The other delegates are obliged to report to their respective Governments.

#### I. CONSTRUCTION OF CARS.

Every automobile in order to be admitted in international traffic on public roads must either have been found suitable for the purpose in a test by the competent authorities or belong to a type which has been admitted in a similar manner. The trial must bear especially on the following points:

- I. The mechanism must be perfectly reliable and so arranged as to minimize the danger of fire or explosion, that saddle horses or driving horses may not be scared by the noises produced, and that the cars will not constitute the least danger to other traffic, nor seriously inconvenience pedestrians by the emission of smoke or steam.
- 2. The automobile must be equipped with the following devices:
  - a. With a reliable steering gear, permitting of steering the car easily and safely.
  - b. With two independent and sufficiently powerful brakes of which at least one is capable of being applied very quickly, and operates directly on the wheels or on brake drums directly secured to the latter.
  - c. With a device which even on heavy grades prevents all backward motion, if one of the brake systems should fail.

Every car weighing, empty, more than 350 kg. (7,770 pounds) must be provided with a reversing gear which can be put into action from the driver's seat.

- 3. The control devices must be so arranged that the driver can manipulate them with certainty without being obliged to take his eyes off the road ahead.
- 4. Every car must be provided with a name plate containing the name of the firm which manufactured the car, the serial number of the chassis, the horse power of the motor, or the number and bore of the cylinders, and the weight of the vehicle, empty.

#### II. REQUIREMENTS MADE OF DRIVERS.

The driver of an automobile must possess those qualifications which are a sufficient guarantee for the safety of the public. As far as international traffic is concerned, nobody can drive an automobile who has not first procured from the competent authorities, or from the authorized associations, after an inquiry as to his

competency, a certificate or driver's permit. Such a permit cannot be issued to persons under eighteen years of age.

#### III. DEPOSITION AND RECOGNITION OF INTERNA-TIONAL ROAD CERTIFICATES.

In international traffic, in order to give proof that the requirements made in Sections I and II have been met, international roads certificates will be issued according to a plan attached to the present agreement. The recognition of these international road certificates can be refused (1) when it is obvious that the conditions under which they were issued do not correspond to the principles of Sections I and II; (2) if the owner or the driver of the automobile does not belong to any of the nations subscribing to this agreement.

## IV. METHOD OF CARRYING REGISTRATION NUMBERS ON CARS.

No car will be permitted to pass from one country into another which does not carry at the rear, plainly visible, in addition to its national number tag, a distinguishing tag with a letter designating its nationality. The form of this tag and of the number, as well as their size, will be defined in a table attached to the present agreement.

#### V. SIGNALING DEVICES.

Every automobile must be equipped with a deep toned horn for the production of warning signals. Outside of built-up districts it is permissible to make use of other warning signals which are in accordance with the regulations and customs of the respective countries. Every automobile must be equipped after dark with two forward lamps and one rear lamp, which latter illuminates the marks on the tags. The road ahead must be illuminated for a sufficient distance, but the use of glaring headlights in cities is prohibited.

#### VI. MOTORCYCLES AND MOTOR BICYCLES.

The provisions of the present agreement are applicable to motorcycles, bicycles and tricycles, with the following exceptions:
(1) The device which according to paragraph 2 of Section I, under letter c, is to prevent backward motion, is not required, nor is a reverse gear obligatory; (2) only one lamp is required, which must be carried in front; (3) the nationality tag needs only be 18 cm. wide and 12 cm. high (7.2x4.8 inches); the letters must be 8 cm. (3.2 inch) high, with a 10 mm. (3% inch) stroke; (4) the horn of motorcycles must produce a high note.

VII. PASSING AND OVERTAKING OF VEHICLES.

In passing and overtaking other vehicles, drivers of automobiles must strictly comply with the local regulations of the district in which they are driving.

#### VIII. ERECTION OF ROAD SIGNS.

Every one of the contracting states agrees to see to it as far as possible that for the purpose of giving warning of dangerous places along the roads, only those warning

signs which are attached to the present agreement are used. It is not excluded, however, that through mutual arrangement of the Governments interested in the agreement, changes may be made in this system of road signs. There should be added to this system of signs a sign designating customs offices and the stop required at these, as well as a sign for road toll stations and octroi stations. The Governments in addition must enforce the observation of the following principles: (1) In general it is not necessary to demarcate road obstructions inside of built-up districts by warning signs; (2) the road signs must be erected about 250 meters ahead of the road obstruction, unless local conditions do not admit of this. If the distance of the sign from the obstruction differs considerably from 250 meters, special arrangements must be made. (3) The road signs must be erected vertically to the road.

#### IX. GENERAL REQUIREMENTS.

The driver of an automobile in any country is obliged to comply with the laws and regulations concerning traffic on public roads in force in that country. An extract of the laws and regulations can be issued to the motorist upon his entrance into a country through the bureau at which the customs formalities are attended to.

#### SUPPLEMENT C.

The nationality tag must consist of an oval shield 30 cm. wide and 18 cm. high (12x7.2 inches), bearing one or two letters in black script, on a white background. These letters must be capitals in Latin script. They must be at least 10 cm. high and possess a width of stroke of 15 mm. The distinguishing letters for the different countries are as follows:

Holland, N. L. France, F. United States, U. S. Portugal, P. Great Britain, G. B. Russia, R. Roumania, RM. Germany, D. Austria, A. Greece, GR. Sweden, S. Italy, I. Spain, E. Switzerland, C. H. Belgium, B. Montenegro, M. N. Monaco, M. C. Hungary, H.

#### To Write Auto Insurance Only.

The Automobile Insurance Company of America has been organized in Indianapolis, with an authorized capital of \$1,000,000 to write automobile insurance exclusively. D. M. Parry, president of the Parry Automobile Company of Indianapolis, is president, and L. M. Littauer, a former member of Congress from New York, is vice president. This is the first company organized for underwriting automobiles exclusively.

At the annual show of the Tristate Vehicle and Implement Dealers' Association, which opened in the Armory Building in Cincinnati, Ohio, on October 25, there were nearly as many automobiles exhibited as carriages. It was explained that many carriage makers are going into the automobile business.

# New Vehicles & Parts

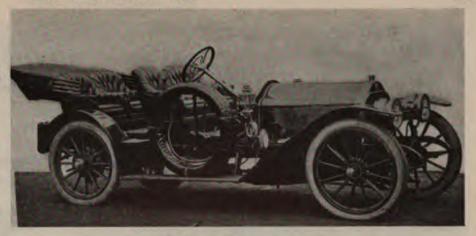
#### The Studebaker-Garford "Forty."

There are several minor changes in the Studebaker-Garford Model G-7 for 1910. The chassis is made at the Garford Company's plant at Elyria, Ohio, and the bodies and equipment are made by the Studebaker Company, of South Bend, Ind. The principal changes are as follows: The fan is mounted on an independent bracket instead of a bracket cast integral with the crank case. The universal joints on the propeller shaft are made larger, with greater wearing surface. The gear case is of entirely new design, of different shape from last year's case, and has the speed lever mounted on top of it. The sliding gear selective type of change gear is retained, however, and another speed forward has been added.

The muffler cut-out, which was formerly on the toe board, is now located on the heel board, and the floor boards, which were formerly aluminum castings, now consist of wood boards mounted in aluminum castings.

The motor is a four cylinder, four cycle and water cooled one, of 434 inches bore and 51/4 inches stroke. The cylinders are gray iron castings and cast in pairs, with intake and exhaust valves on opposite sides. They are carefully bored, reamed, ground and then lapped with clear oil with the pistons and rings in place. The water jackets are spacious, allowing free water circulation throughout. These jackets taper so that the greatest amount of water is at the top, where the temperature is the highest. The large openings over the water jacket provide for a careful inspection, and a certain removal of core sand, and are covered with aluminum plates. The small openings at the ends allow easy cleaning of the water jacket at any time, and are covered by cast iron plates.

The pistons are of the same material as the cylinders and are long, with four ec-



THE STUDEBAKER-GARFORD MODEL G-7.

centric rings ground on three sides, with step joints. There are also three oil grooves below the piston pins to provide for thorough distribution of oil on the cylinder walls. The hollow piston pins are Its inches in outside diameter and 45% inches long.

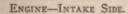
The connecting rods are I section drop forgings of 50 point carbon steel. They are 111/2 inches long. The upper connecting rod bearing is bushed with tool steel, hardened and ground to size. This bearing is 11/8 inches diameter and 21/2 inches long. The lower end bearings have die cast bushings of white bronze; these are 134 inches in diameter and 3 fe inches long. The top of the connecting rod is milled out to quite an extent, to form a basin in which to catch oil from the splash to lubricate the pins. The top bearing, however, instead of being milled like the connecting rod, is drilled with several small oil holes, which, being staggered, do not take away any of the bearing surface of the bush. The valves are single piece, drop forgings of 50 point carbon steel. They are 23% inches in diameter with 7-16 inch stems, and 36 inch lift. The lower end of the stem is hardened to prevent rapid wear. It is slotted to receive a flat key. which retains the valve spring cup. The cup is counterbored and drops down over the key and holds the key in place.

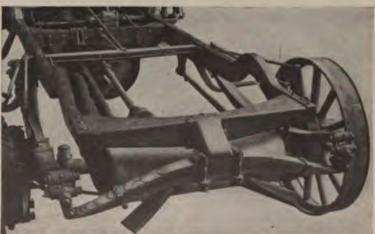
The valves are operated by valve lifters

of the roller type, these rollers being ground all over to size. The lifters work in brass guides and are provided with coiled springs to keep the roller continually pressed against the cam, thus preventing the possibility of slopping. The cams are of 20 point carbon steel, hardened and ground internally and externally. The external grinding is done with the aid of a master cam, so that every cam must be like every other. The cams are fitted to the cam shaft by means of keys and pins. The cam shaft is 3% inch diameter and of high carbon steel, hardened and ground, with three bearings, the two end bearings being 3 inches long and the centre 3th inches long. The cam shaft gears are of fibre and they mesh into the steel crank shaft pinion. The crank shaft is a 50 point carbon steel drop forging, hardened and ground. The main bearings are 118 inches in diameter and of various lengths, the front one being 35% inches long, the centre one 31/2 inches long, and the rear one 434 inches long. The extreme rear end acts as a pilot for the clutch. The crank shaft is provided with rings to catch the oil thrown from the ends of the bearings and carries it by centrifugal force to the hollow crank pin bearings. The flange to which the 17 inch cast iron, solid web flywheel is bolted is forged integral with the crank shaft.

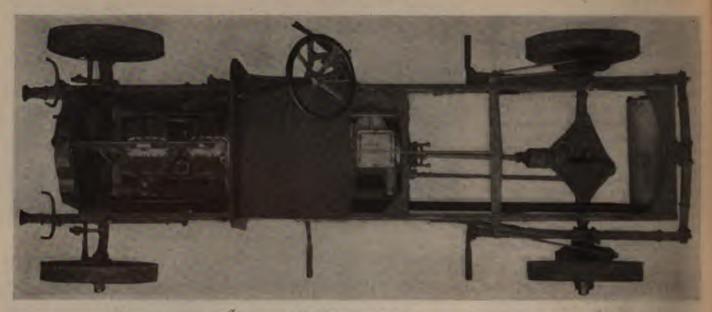
The crank case is an aluminum alloy







REAR VIEW OF CHASSIS SHOWING BRAKE AND PLATFORM SPRING.



PLAN VIEW OF CHASSIS.

casting in two separate pieces, the upper portion containing all the crank shaft bearings, of which the lower portion is entirely independent. The lower portion holds the oil for the splash lubrication and is supplied with oil by a gear driven Lavigne oiler with three main leads, one lead to each of the three crank shaft bearings. The lower case is provided with an oil drain cock, which governs the oil level.

The cam gears and magneto and pump shaft gear are all contained in an oil tight compartment at the front, and run in an oil bath.

Cooling is effected by a cellular radiator, a gear driven centrifugal pump and a ball bearing fan, driven by a 1 inch flat belt at 2½ times the motor speed and mounted on a bracket secured to the top of the gear compartment. The top of the fan bracket is provided with an eccentric for adjusting the tension of the belt.

The carburetor is of float and needle type and embraces the Venturi tube principle. It is located on the left hand side of the motor, midway between the cylinders, and connects to the inlet chambers by means of a Y shaped copper manifold of liberal diameter.

Ignition is by means of Bosch magneto and magnetic spark plugs.

The cone clutch is carried on the end of the crank shaft on a bronze bearing. It is 14% inches in diameter, with eighteen cork inserts and seven flat springs, to insure smooth action. The end thrust of the clutch spring is carried on a ball thrust and the clutch release collar is provided with a ball thrust bearing of large diameter. Between the clutch and the change gear is a double universal joint of block and trunnion type enclosed in a grease tight hardened and ground square sleeve.

The change gear is four forward speed and reverse selective type, with the gear lever working in an H slot quadrant. The direct drive is obtained on the third speed,

and the fourth speed is geared up. The transmission shafts are carried on annular ball bearings, and the forward end of the direct drive shaft is carried on an annular ball bearing in the direct drive gear. The gear case is barrel shaped, with an end plate at the rear end, the front end being solid, except where the bearings are inserted. The direct driving gear is mounted on two annular ball bearings. The propeller shaft is provided with a Cardan and cross universal joint back of the gear case, and a block and trunnion universal joint at the rear axle. These joints are all provided with pressure grease cups for lubrication. The drive bevel pinion is provided with annular ball bearings on both sides. The rear axle is of the full floating type, with the differential, which is of bevel pinion design, carried on cup and cone adjustable ball bearings. The wheel drive clutch plates are pressed on to the squared ends of the inner axle. The car load is carried on the heavy tubular axle housings. The spring pads are provided with a bearing and a grease cup, so that the axle may work without torsional strains on the springs.

The rear axle or bevel gear casing is a malleable iron casting, and is provided with a large cover, so that the differential can be removed without jacking up the car. Radius rods from the rear axle to the frame carry all the driving strains, while a pressed steel torque rod, supported on spring cushions, takes the torque strains. The rear wheels ride on cup and cone adjustable ball bearings.

The front axle is a one piece drop forging, with spring pads forged integral. The steering knuckles are carried on ball thrust bearings, with pressure grease cups at the top of the pivot bolts. The wheel spindles are fitted with cup and cone ball bearings.

The steering gear consists of a worm and gear, with ball thrust bearings above and below the worm. The worm gear is carried in eccentric phosphor bronze bearings which allow of adjustment. The 18 inch steering wheel is of mahogany fitted on a solid rim bronze spider. The spark and throttle control levers are located on a stationary quadrant above the steering wheel. The steering reach rod has ball and socket joints at both ends, which are fitted with spring cushions on both sides of the ball. The speed control and brake levers are drop forgings, and supported by a manganese bronze bracket.

The brakes are external contracting and internal expanding. The internal brake shoes are fitted with cork inserts. After the brake shoes are assembled they are ground concentric with the rear axle spindles to obviate the possibility of dragging. The brakes work through bar equalizers, and are operated by the usual pedal and hand lever.

The frame is of cold pressed nickel steel, of channel section, with a sub-frame on which are carried the motor and gear box. The frame, instead of being dropped, is arched over the rear axle to give a low suspension. The springs are semi-elliptic front and rear. The front springs are 40 inches long, 2½ inches wide and have seven leaves. The rear suspension consists of three point suspension platform springs. The side members are 50 inches long, 2½ inches wide and have nine leaves. The cross member is 36¾ inches long, 2¼ inches wide and has seven leaves. Every chassis is equipped with shock absorbers in front.

The gasoline tank is located underneath the front seat and holds 14 gallons. The wheel base is 118 inches. The standard equipment consists of two gas headlights two oil side lights, one oil tail light. Prest-O-Lite tank, robe rail, foot rest, tire irons, full set of tools, jack and tire repair kit.

Oscar Bergstrom, of Minneapolis, Minnahas invented and placed on the market a tire pump operated from the wheel hub. It is to be known as the "O-B" pump.

#### The De Dion Three Ton Truck.

This machine, which for the most part is built on standard lines, possesses some features which are characteristic of De Dion construction, but which are modified for the requirements of this paraticular class of work.

The wheel base is 146 inches and the tread 66 inches. The wheels are 32 inches in diameter, shod with solid rubber tires, twin tires being fitted in the rear. The chassis frame is of armored wood. The rear springs are semi-elliptic and the front springs three-quarter elliptic, insuring freedom from vibration of the motor and dri-

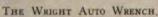
The change speed is a three speed and reverse selective, similar to the four speed used on their eight cylinder, 50 horse power car. The change speed lever works in a straight slot. The lubrication is by a geared oil pump within the gear case. The final drive is a slight modification of the regular De Dion construction employing Cardan driving axles. In this case the driving axles are connected to pinions which mesh with gears on the wheels, both the pinions and gears being enclosed in dustproof cases. This construction gives not only the necessary reduction of engine speed for the comparatively slower moving truck, but also al-

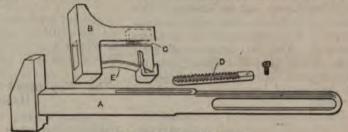
hand. The advantage of having one hand free while working with the wrench is ob-

In the accompanying cut, A is the bar which forms the handle and head; B, the jaw; C, the pawl, set into jaw; D, the rack which when the wrench is put together is set into the bar and held in place by set screw; E, the spring.

When the wrench is put together the jaw slides up and down on the bar, after being released by a slight pressure of the thumb on the back of jaw. When the jaw is adjusted to fit the nut the pressure is taken off the spring and immediately the







PARTS OF WRIGHT WRENCH.

ver's seat. The motor, which is located under the driver's seat, as is now well nigh universal practice in truck construction, follows the regular De Dion practice. It is a four cylinder of 25 horse power, fitted with magneto ignition. Both inlet and exhaust valves are mechanically operated. The carburetor is of De Dion make, and is of that type which employs a very small tube around the jet, thus forming a very rich mixture, which is afterward diluted by the air admitted through an auxiliary port of large size, controlled by an automatic valve. It is claimed for this type of carburetor that it is less likely to catch fire than the ordinary automatic type.

The clutch is their regular plate pattern.

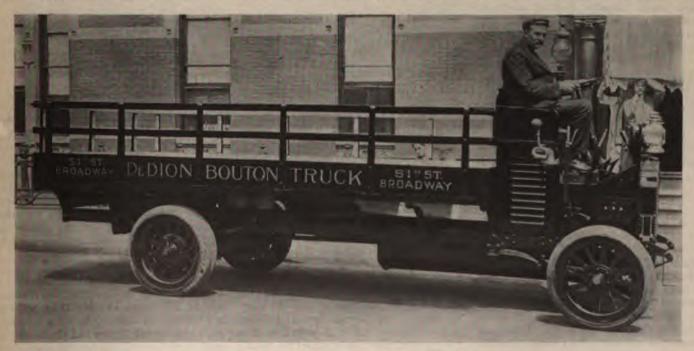
lows of much smaller driving axles than would the ordinary type of live rear axle.

# The Wright Wrench.

The Wright monkey wrench, manufactured by the Wright Wrench Manufacturing Company, of Canton, Ohio, while designed to do the work of the ordinary wrench is a radical departure from other wrenches in construction. It is made without a screw and is adjusted to fit the nut by means of a slight pressure upon the jaw with the thumb of the hand holding the wrench. It will thus be seen that but one hand is required to adjust and operate the wrench, leaving the other free for other purposes. It can be used equally well with either

pawl engages the rack, holding the jaw firmly in position. The pawl and rack each have a set of ratchet-like teeth which fit into each other and prevent the jaw from having any play after it is once set. The jaw is instantly released from the nut, however, by a slight pressure upon the spring. While the wrench is in use the spring has no strain upon it.

The Regal Automobile Company, of Detroit, have completed arrangements for the establishment of a \$100,000 plant in Windsor, Canada, to supply the Canadian trade. The plant will have a capacity for an output of five machines a day. Building operations will start in a week or two.



TWENTY-FIVE HORSE POWER DE DION TRUCK.

#### The Lansden Truck.

In order to reduce the ton-mile cost of goods transportation by motor wagon it is necessary to keep the trucks in operation as much of the time as possible during the working hours. This means, among other things, that the time taken for loading and unloading should be as little as possible, and any method which reduces this time is a means toward the desired end.

The Lansden Company, of Newark, N. J., realizing this point, have designed and manufactured a four wheeled electrically propelled truck for the purpose of transporting goods from one point to another in large warehouses and on wharves. This was specially built for the service, and was adapted to turn practically on its own centre as a pivot. They have lately brought out a three wheeler of smaller capacity than the four, designed for similar use, and also for the handling of baggage in large railroad terminals.

The maximum speed of the machine (4½ miles per hour) is purposely made very low. The mileage is about 18 per charge. This means about four hours of continuous running, but owing to the fact that the battery may be partially recharged while the truck is being loaded and unloaded at various points, and also to the fact that it, of course, is not in continuous use all the time, it can be run through an ordinary working day on one charge. The wheels are made small, the drivers being 24x6 inch, with solid rubber tires, and the steering wheel being of cast steel, 18x6 inches. The wheel base is 5 feet and the tread 52 inches.

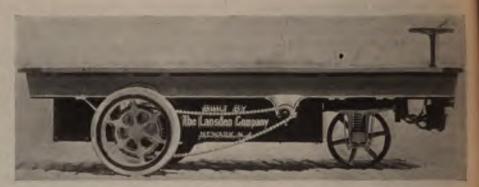
The platform load carrying space is 10x4 feet. The height from the ground to the platform is only 28 inches, which permits of easy loading and unloading. These machines have already been successfully used for baggage trucks in depots, as well as for dock work. Another field of usefulness would be as a substitute for industrial railways in large manufacturing plants, mills, etc.

# The Eureka Self Closing Nozzle.

The accompanying cut represents the Eureka self closing nozzle, handled by Geo. Grosselfinger, 192 Front street, New York. This nozzle is designed for garages, livery stables, and in fact anywhere that large quantities of water are used. When this



nozzle is used there is no waste of water while turning on or off at the end of a 25 or a 50 foot leugth of hose. It is so constructed that the valve closes when released or when the hose is dropped. Water is turned on and shut off by the closing and opening of the hand. This nozzle is rubber covered and has a flexible rubber tip for spraying purposes. Consequently, the high-



LANSDEN DOCK TRUCK.

ly polished surface of the automobile will not be scratched or damaged by coming in contact with the same. It is made in three-quarter and I inch sizes.

# The "Keystone" Safety Starting Handle.

A safety starting crank, which, it is claimed, cannot rotate backward more than a few degrees if the engine backfires, has been brought out by the Keystone Starting Handle Company, of Philadelphia, Pa. The ordinary form of this device contains three essential parts. A central portion I is



THE KEYSTONE SAFETY STARTING HANDLE.

rigidly fastened to the car, and provided with a ball race or notches in which a pawl may engage; an outer portion 2 is free to turn forward, but a pawl, ball or roller 3, ordinarily idle, serves to lock it to part I against reverse rotation. On part 2 is a cam A, shown in the cut, which ordinarily is carried along with the handle when cranking. In case of a backfire, however, the cam, being a portion of part 2, cannot rotate backward. The handle starts to turn backward, bearing against the edge of the cam, which is so shaped that handle and starting shaft are forced ahead and the clutch between the engine and handle shafts is thus disengaged. Under ordinary conditions when the engine is started this cam does not interfere in any way and the handle is thrown out as usual.

A second form, brought out for use where it is not desirable to have the starting handle bear directly against the cam, is made in four parts. A central portion I is attached to or made part of the handle shaft, and is provided with a ball race or notches; a second portion surrounds the

first and is limited to slight rotation. A pawl, ball or similar piece 3 unites the first two parts in such a way as to permit forward rotation, but to lock them if the handle starts backward. In the latter case a cam on part 2, which bears against a fixed projection 4 on the car, is so shaped that in a few degrees rotation it is forced ahead, carrying with it the starting handle and shaft and disconnecting them from the engine shaft.

## Two Clark Models.

The Clark Motor Car Company, of Shelbyville, Ind., are at present putting through two series of cars, one a 30 horse power touring car, to sell at \$1,400, and the other a 40 horse power touring car, to sell at \$1,750. The 30 horse power car is equipped with a 4x4 inch Rutenber motor, 34 inch wheels and 31/2 inch tires. It has a wheel base of 110 inches. The equipment includes five lamps, a Prest-O-Lite tank and a Remy magneto. The 40 horse power car is equipped with a 41/2x5 inch motor and has 34 inch wheels, with 4 inch tires. The wheel base is 118 inches. The equipment is the same as that of the 30 horse power. Both cars are fitted with five passenger bodies.

Meixell-Downing Company, 505 Odd Fellows Building, Indianapolis, Ind., are general sales agents for these cars. It is stated that deliveries will begin on December 15.

# The Continental "35," a New Car.

After considering a number of names, the Indiana Motor and Manufacuring Company have decided to name their car the Continental. The company was recently organized by Indianapolis men, and a factory has been established at Franklin. The product will be distributed by the Indiana Motor Sales Company, of Indianapolis, who inform us that they have placed an order for 1,000 Continental "35" cars for the season of 1910. It is a five passenger touring car, and will sell for \$1,400.

Frank D. Moon has secured a lease on a corner property at Lawrence and Clifton avenue, Edgewater, Ill. Mr. Moon will begin immediately the erection of a fireproof brick and cement factory and showroom, to cost about \$20,000. He expects to place on the market a business runabout and a light truck.



# What Makes For Hard and Easy Steering.

Editor Horseless Age:

If Mr. Sharples will take an ordinary bicycle and study its steering he will get some facts about steerings that will materially help him on the auto steering problem. A cycle wheel has the pivot or centre on which it turns in the plane of the wheel. The pivot line if extended will strike the ground directly ahead of the point of contact between the tire and ground. This is true of any caster, so the cycle wheel forms a caster and steers itself. If the line hits exactly as it should the cycle will easily be ridden hands off. But bend the forks to one side so as to throw the line to one side and the wheel will run to one side. But which side is the question. If the pivot is vertical, or nearly so, as in a caster, the wheel will run farther away from the straight ahead direction. But if the pivot has much rake to the rear at the top the wheel may run toward the straight ahead line. In auto wheels the pivot lines are usually nearly vertical, and they strike the ground inside the wheels. Disconnect the tie rod and the wheel will usually swing around to the rear and stand crosswise the line of motion. The tendency of one wheel to do this is balanced by the opposite tendency of the other one usually. So the trouble Mr. S. is having is not a matter of sidewise position of the pivots. If the pivots have some rake and point forward at the bottom, as does the cycle wheel, the vehicle will tend to steer itself, and will straighten up when power is being applied. Run the vehicle backwards and the erratic action of the steering will be at once apparent. In Mr. S.'s rig the pivots need to be raked forward at the bottom further. They probably strike the ground behind the point of wheel contact and the rig will steer better when running backward than when running forward. This condition may have been brought about / by running the rig against some curb or wall. In a cycle wheel the axle is much ahead of the steering pivot line, which shows the position of the axle has nothing to do with it. Some of the Stanley steamers were built with a very great rake and could run at speed with no danger of deflection. In fact, it took a strong pull on the lever to get them out of their course at speed.

In your able article on selling commercial vehicles at dull seasons of the year you overlook another rig that is in season when the usual pleasure vehicle is not. I refer to the motor buggy. This rig has hard tires and is usually air cooled, and so is not likely to give its user trouble in bad weather. It can stand up when the horse slips down on the ice, and is most needed when the

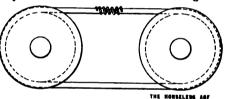
days are short and the busy doctor has not time enough to get around to his patients. It does not sell to the man who wants a conventional rig, but to a different class of buyers; and each buyer of a motor buggy will want a luxury rig some day, so it educates up to the better class of goods. It cuts into the horse carriage business, but helps the auto business. Many dealers turn up their noses at the idea, but they have some things yet to learn.

CHAS. E. DURYEA.

# Trouble from Belt Slipping. Editor Horseless Age:

The pumps in the mechanical oiler of my car are run by a round leather belt, with a section of about one-quarter inch diameter. running on two brass sheaves of about 4 inches diameter and I inch apart. I find great difficulty from this belt slipping owing to its stretching and absorption of oil, which it is impossible to keep away from it. I will be greatly obliged if you can advise me of any other kind of belting which would overcome this. Would a short, stiff spiral spring (as shown on sketch), substituted for the ordinary staple connection in the helt, answer, or is it possible to apply any dressing to the leather to prevent the loss of friction by the oil? BEGINNER.

[We do not believe that a short length of



coiled spring would be of much use in keeping the belt taut. Special piano wire coil belts are made for such purposes, and we would recommend that you get one of these, which can be obtained from any of the large supply stores. Usually these belts are about five-sixteenth inch in diameter, but you may be able to spread the flanges on the sheaves sufficiently to make the five-sixteenth inch belt keep on the sheaves.—Ep.]

# Magneto Ignition of Motors at Slow Speed.

Editor Horseless Age:

Referring to your recent editorial remarks on the insufficiencies of magnetos for motors when driving in dense street traffic on the high gear, your strictures cannot be held to apply generally.

The writer can vouch for it that there is one magneto at least on the market which will give a spark of full value when turning over only thirty-five times per minute. For a four cylinder motor the magneto speed is also that of the crank shaft, so that at only thirty-five revolutions per minute of the motor full ignition is had with this magneto.

Now 3 miles per hour is certainly a very slow speed in dense traffic or elsewhere; for 32 inch wheels that means thirty-two revolutions per minute of the rear axle. There are probably no cars in which the direct

reduction to the rear axle is less than 2 to I, which would give a magneto speed of sixty-four revolutions per minute, or much more than the thirty-five at which the Hess-Bright gives its full spark.

The writer has the best of reasons for knowing whereof he speaks; these reasons are most exhaustive, and long continued tests of day in and day out continuous running on the test stand, not only at this slow speed of thirty-five but also at the very trying higher speed of 3,300 revolutions per minute.

This slow speed coupled with an ability to retard the spark clear back, without changing its value from the maximum that is constant through a complete range of 55 degrees, is of value, not only for slow running but quite as much because it permits an easy cranking of the motor directly on the magneto, and without any complications by special mechanisms, and combines this with absolute safety while cranking.

These tests referred to, supplemented by the records of use by many builders of European automobiles, cabs and trucks, coupled with a constant spark for all positions of advance and retard, induced the writer to acquire the control of this magneto for this continent. Henry Hess, For the Hess-Bright Manufacturing Company.

[We would like to know what Mr. Hess means by "a spark of full value." He certainly cannot mean that his magneto will generate as large a spark at 35 r. p. m. as it will at any higher speed of revolution. Are we to understand that at 35 r. p. m. the magneto will generate a spark of sufficient volume to ignite a charge just at the limit of ignitibility; that is to say, a charge so poorly dosed and so much contaminated with spent gases that it is barely possible to ignite it by the most powerful spark?—Ep.]

# Auto Insurance in Mexico.

Editor Horseless Age:

Owing to the fact that there are no insurance companies in Mexico that will take risks on automobiles, we are writing to you with a view of obtaining information in this line.

Any information with which you may furnish us in the line of insurance companies in the United States that will take risks on automobiles in Mexico will be greatly appreciated.

McKie Walker.

[We have been in communication with practically all the companies represented in New York, and were informed that none of them write automobile insurance in Mexico, practically all confining themselves to the United States and Canada. It was suggested by one company that possibly the Lloyds of London would accept the risk, but their representative in this city could not confirm this, as all insurance matters are handled from London directly. We would therefore advise you to write to the company in London.—Ep.]

# Overcoming Need of Frequent Valve Grinding.

Editor Horseles Age:

Having noticed the article by W. R. Van Brunt, describing his troubles and the necessity of the frequent grinding of the valves of his car, let me say that Dr. Edward G. Acheson has run a Packard "30" fully 19,000 miles, and not a spark plug in it has been cleaned or a valve ground. This car has at times attained a surprising speed, indicating a large increase in power. Oildag is the lubricant used in the cylinders, and to this lubricant are attributed the results obtained. I may add this car is making 750 miles on a gallon of Oildag, whereas I believe the makers of the car advocate running such cars 150 to 200 miles on a gallon of oil. O E DUNLAP

## New Officials of American Federation of Motorcyclists.

Fred I. Willis, president of the Federation of American Motorcyclists, has announced the following appointments for the ensuing year: Membership committee: E. M. Estabrook, Bangor, Me., chairman; George W. Sherman, Chicago; W. F. Hapgood, Springfield, Mass.; F. B. Hart, Chicago, and W. F. Remppis, Reading, Pa. Competition committee: Dr. J. P. Thornley, New York City, chairman; Will Douglas, Louisville; F. L. Valient, New York City; J. S. Patterson, Chicago and Stephen Mc-Iver, Riverdale, Cal. President Willis is secretary and general manager of the Hearsey-Willis Company, automobile and motorcycle dealers, Indianapolis.

# Detroit Motor Club to Affiliate with A. A. A.

The newly organized Detroit Motor Club held a meeting in the Hotel Tuller on October 12, at which a resolution was passed to apply for admission to the A. A. A. through the Michigan State A. A. The proposed constitution and bylaws were provisionally adopted, and will be incorporated in a booklet to be published shortly. The club is carrying on negotiations with the Canadian Government for an arrangement by which members will be given visitors' privileges in Canada, and not be required to put up a bond. The club has its headquarters at the Hotel Tuller, and John Gillespie is secretary.

# Automobile Track Planned for Little Rock, Ark.

Announceemnt has been made at Little Rock, Ark., that Clinton Park, the local race track formerly operated by the Tilles-Celta Syndicate, will be remodeled for an automobile course. Little Rock capital is behind the project, and it is planned to hold a meet early in the spring.

The Interstate Auto Company, of Muncie, Ind., are building a 430x66 foot addition to their plant. The company expect to manufacture 2,500 cars in 1910.

# American Road Makers in Convention.

That all States should adopt the policy of giving State aid to counties in improving the highways of the country was the consensus of opinion of the 2,500 delegates who attended the good roads congress held in Columbus, Ohio, closing October 29 after a four days' session. Speakers representing the highway commissions of about a score of States, and delegates representing thirty-three States and Territories, attended the convention, which was probably the largest and most enthusiastic ever held in America.

One of the features of the meeting was the address of Samuel H. Hill, a relative of J. J. Hill, the railroad magnate, who attended from Seattle, Wash. Mr. Hill is one of the original good roads campaigners of the Pacific Coast. He advocated the employment of convicts in road building.

At the meeting of the Ohio Good Roads Federation a resolution was adopted favoring the Alsdorf bill, which provides for county aid, with perpetual maintenance by contractors. The congress voted to cooperate with the Daughters of the American Revolution in securing a boulevard from Yorktown to Jamestown, via Williamsburg.

Officers of the American Road Makers' Association were elected as follows: James H. MacDonald, Hartford, Conn., president; Samuel H. Hill, Seattle, Wash., vice president; E. L. Powers, New York, secretary, and Joseph W. Hunter, Harrisburg, Pa., treasurer. The executive committee will meet soon to decide the place for the 1910 convention. Columbus, Ohio, Omaha. Denver, Rochester and St. Louis are desirous of entertaining the association. James H. McDonald, Samuel H. Hill, E. L. Powers and A. C. Campbell were named delegates to represent the association at the international road congress to be held in Brussels in July.

# A. A. A. State and Club Membership.

In preparation for the annual meeting of the American Automobile Association. which will be held at the end of November, Secretary Frederick H. Elliott has been compiling a complete list of State associations and clubs affiliated with the National body. The growth in State associations during the past year has been particularly marked, there now being associations in thirty-one States, this including, however, the Hawaiian Association. In respect to membership the New York State Association leads with 4.518 members, the Pennsylvania Motor Federation coming next with 3,113, and the Associated Automobile Clubs of New Jersey, third, with 2,156. Six organizations have a membership of over 1,000-Minnesota, Ohio, southern California, Illinois, Massachusetts and Connecticut. Among the large number of clubs affiliated with the national body the latest statistics show that forty have a membership of over

100. The Automobile Club of Buffalo heads the list with 1,827 members, followed by the New Jersey Automobile and Motor Club with 1,274, while the Automobile Club of Philadelphia is just short of 1,000. The automobile clubs of Chicago, Minneapolis, Cleveland, Long Island and Rochester each have over 500.

# Circuit of Shows Planned for Central New York Cities.

The Binghamton (N. Y.) A. C. will hold an automobile show in the State Armory, February 21-26. A plan is on foot between the automobile clubs of Buffalo, Syracuse and Rochester, with the object of holding a circuit of shows in regular succession in the big cities of central New York, and inducing the leading firms in the industry to patronizz all of the shows. The Buffalo show will be held February 14 to 19. In Rochester a show will be held probably the first week in March, and in Syracuse the second week in March.

# E-M-F Canadian Company Organized.

The Everitt-Metzger-Flanders Company is organizing a subsidiary company, to be known as the E-M-F Company of Canada, for supplying the Canadian, British and British Colonial trade. The plant of the Globe Furniture Company in Walkerville has been purchased, and will be equipped for the manufacture of automobiles at once Among the stockholders of the Canadian company are Fredk. H. and J. Harrington Walker, of Hiram Walker & Sons Company, Walkerville. Both the E-M-F "30" and the Studebaker-Flanders "20" are to be manufactured in the Canadian plant.

# Packard Philadelphia Branch.

Packard cars will hereafter be sold in Philadelphia and surrounding territory by the Packard Motor Car Company, of Philadelphia, which has purchased the business of the Keystone Motor Car Company. The business will be conducted at the same store, 216 North Broad street. M. J. Budlong, who is president of the Packard Motor Car Company, of New York, is also president of the Packard Motor Car Company, of Philadelphia. Mr. Godshalk, who retires from the business on account of this purchase, was one of the earliest Packard dealers and introduced the Packard to Philadelphia in the season of 1904.

## General Motors Stock Dividend.

The General Motors Company has declared a stock dividend of 150 per cent. on its common stock, which will be payable November 5. The company recently increased its common stock from \$5,500,000 to \$40,000,000, and the stockifolders will therefore receive a portion of the newly issued stock. Since its organization about a year ago the company has paid a dividend of 7 per cent. on its preferred stock, but no cash dividend has yet been paid on the common stock.

# New York-Atlanta Good Roads Tour.

The New York Herald tourists started on the third day of their journey from Gettysburg at 7 o'clock last Wednesday morning, and traversed the southern section of Pennsylvania, crossed the narrow eastern creek of Maryland and the northeast corner of West Virginia, then dropping into the historic valley of Virginia. This was the longest day's run.

The contestants encountered roads of all sorts and conditions, and yet but one competing car was penalized for being behind the schedule, while another met with an accident which put it out of the contest, though luckily neither of the two passengers was seriously injured. In addition penalties were imposed on four contestants for yielation of road rules.

Near Middletown, Va., about 16 miles southeast of Winchester, where the noonday halt was made, the Oldsmobile, entered and driven by Frederick Weis, of Brooklyn, N. Y., in seeking to pass the Craig automobile, crowded close to the edge of the highway, and as it came abreast of the latter's machine Mr. Weis's car struck a big stone flanking a culvert at this point, causing it to skid violently against the Craig. One of the rear wheels on the Oldsmobile snapped off and the car was thrown into the ditch.

Though the bad roads encountered during the morning between Gettysburg and Winchester caused much tire trouble and tried the springs of every car, only one other contestant besides Mr. Weis suffered a penalty through belated arrival at Staunton, Va.

Thursday's run covered the 92 miles between Staunton and Roanoke. The start was made at 8 o'clock sharp. The route led through the historic city of Lexington. All but one of the thirty-five contesting cars rolled into Roanoke on schedule time, and not a single penalty was imposed. The car that failed to arrive within the allotted running time was the Thomas, entered by Mrs. F. De Giers, of New York city. This contestant had the misfortune to break a steering knuckle in the run from Gettysburg to Staunton. More than three hours was occupied by a village blacksmith in making a repair. A penalty of 636 points was im-

posed on this car, which already had 67 points against it.

Friday's run took the tourists from Roanoke to Winchester, N. C., a distance of nearly 126 miles. The start was made at 7 o'clock, as the course was over hills and across many fords. Thirty-two of the contesting cars arrived at Winston-Salem with clean scores, while four cars failed to arrive within the allotted time. One car had broken down near Stoneville, a village 43 miles from Winston-Salem. Another contestant, F. D. Hughes, of New York, driving a Chalmers-Detroit, wired that owing to illness he and his wife would spend the night in Martinsville, Va., where the noonday stop for lunch was made, and would join the party at Charlotte, N. C., where Saturday's run ended. The other entrants delayed in reaching Winston-Salem included Mr. and Mrs. F. J. De Giers, of New York city, who broke a steering knuckle on Wednesday; the Maxwell, entered by its makers, which was said to have broken an axle fording Big Chestnut Creek in Virginia with its muddy approaches, and the Franklin car, driven by George H. Storck, of Jacksonville, Fla.

At this stage of the tour the only cars actively in the contest bearing penalties were the Oldsmobile, entered by Henry J. Lamar, Jr., of Macon, Ga., which had 24 points against it, and the Maxwell, entered by the Maxwell-Briscoe Motor Company.

Saturday's run led to Charlotte, N. C., a distance of 137 miles, where the tourists rested over Sunday. Of the thirty-eight original contesting cars thirty-two checked out of Winston-Salem for Charlotte. Only one met with a serious mishap on the day's run, while another received a small penalty for lateness. On examining the official records it was found that twentynine of the entrants still had clean scores. Of the six cars that had dropped out, two had expressed an intention to continue to Atlanta. The Pope-Toledo, entered by the Chamber of Commerce of Lynchburg. Va., dropped out at Philadelphia, after the first day's run. The Oldsmobile, entered by Frederick Weis, of Brooklyn, N. Y., retired near Gettysburg. F. D. Hughes, driving a Chalmers-Detroit, wired Saturday that he must withdraw, owing to illness. Mr. and Mrs. F. J. De Giers, of New York city, wired that they had reached Salisbury, N. C., and would continue to the end. Joseph D. Boyd wired that be and the Maxwell would be in before the departure of the tourists on Monday.

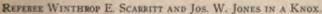
A fire that broke out in the open air parking space in Charlotte came near to destroying the majority of the cars in the tour. The gasoline tank of the Selden car entered by Evelyn Harris, of Atlanta, had sprung a leak, and the fluid had spread over the planking on the ground, when a pedestrian lit a cigarette and threw the burning match into the gasoline area. There was a hurried call for the fire department, while willing hands pushed the blazing car away from its neighbors. The Selden car had to be rewired before proceeding on the tour.

On the Stearns car of Col. and Mrs. William L. Peel, of Atlanta, the steering gear broke just outside Roanoke on Friday morning. Temporary repairs were made, but another breakdown resulted near Salisbury, N. C. Dr. De Giers carried Mrs. Peel to Salisbury, while Colonel Peel and Mr. Tilt, with the aid of a blacksmith, repaired the damage, and telephoned later that they had reached Concord, N. C., 24 miles out of Charlotte.

On leaving Charlotte on Monday morning the procession headed for Greenville, S. C. Thirty-one contesting cars made the run without being penalized. Eleven miles out of Charlotte the cars were ferried over the Catawba River on a small floating barge propelled by the current and lashed by long ropes to a cable stretched across the stream. Only two cars could be carried at a time, and owing to the delay thus occasioned the contestants were not formally checked out until the further bank had been reached.

At this stage there was only one contestant in the run with a penalty against it, the Oldsmobile entered by Henry J. Lamar, Jr., which was penalized 24 points. Others who had suffered penalties, but still continued, dropped into the non-competing class. The Craig car, a non-contestant carrying supplies of the Ajax-Grieb Rubber Company, broke a steering knuckle near







THE BENZ CAR IN THE TOUR.

Kings Mountain, but the village blacksmith soon had it repaired.

Tuesday's run from Greenville to Commerce, a distance of 110 miles, brought several in the endurance run to grief. Twentysix entrants still retained their perfect scores, though accidents resulted in the penalization of two contesting cars that had previously escaped, while another withdrew, and the Jackson, driven by Jacques Futrelle, was so delayed that its withdrawal was expected. Near the village of Piedmont, 12 miles out of Greenville, the Jackson car bent its axle. A roadside blacksmith soon remedied the trouble, but later, 10 miles out of Anderson, S. C., in trying to avert a collision with a farmer's wagon, Mr. Futrelle ditched his car. He was pulled out by the Maxwell machine which became a non-contestant the day before. The strain was so great, however, that the "good Samaritan" sheared off its transmission shaft. The drivers of both cars expected to be in line for the start of the last day's run.

The White Star, built in Atlanta, withdrew from the contest at Anderson, the noon stopping place, owing to a twisted crank shaft. The disabled car was towed in by Mrs. Cuneo in the official car. The Knox, entered by W. A. Kelly, of New York city, broke a throttle lever rod and came in late, being penalized 148 points. The Studebaker, entered by the Board of Trade of Winston-Salem, N. C., snapped a rear wheel near Lavonia, S. C., but its passengers managed to repair it and reached Commerce with a penalty of only 27 points.

At the outskirts of Anderson, S. C., a banner conveyed the following information to the tourists: "Speed Limit 100 Miles per Hour. We Are Glad You Came, so Come Again."

Wednesday morning twenty-eight contesting cars checked out at Commerce, Ga., for Atlanta, 81 miles distant. Of these twenty-six finished with clean scores, and of the thirty-eight cars that left Herald square thirty-five safely reached the final destination on time. Only three cars were compelled to withdraw during the whole tour on account of accident. Of those who finished seven had formally withdrawn

from the endurance contest for the tour prizes, owing to delays which had resulted in heavy penalties. The following cars arrived at Atlanta still in the contest:

THE HORSELESS AGE.

No. 4 Thomas, No. 17 Thomas, No. 22 Oldsmobile, No. 23 Thomas, No. 30 Renault, No. 35 Matheson, No. 44 Benz, No. 54 Franklin, No. 48 White Steamer, No. 20 Premier, No. 25 Pennsylvania, No. 46 Oldsmobile, No. 52 Corbin, No. 39 Selden, No. 2 White, No. 7 White, No. 5 White, No. 10 Buick, No. 14 Studebaker, No. 16 Buick, No. 26 Maxwell, No. 43 Chalmers-Detroit, No. 28 Maxwell, No. 19 Studebaker, No. 31 Reo, No. 42 Regal, No. 28 Maxwell.

# Holding Pool for General Motors Stock Planned.

Holders of the preferred stock of the General Motors Company have received a circular signed by W. C. Durant, requesting them to co-operate in a plan to establish a holding pool for the control of the company's preferred stock for a period of fifteen months. In the letter it is explained that in comparison with other securities bearing the same interest (7 per cent.) this stock is selling at too low a price "for the reason that the market is now controlled by brokers acting entirely in their own interests and for their own personal gain." The stock now is around 881/2.

The letter continues: "I am very well satisfied that the real market value of this security cannot be established until the larger holders of this issue co-operate to the extent of having the offerings made through some regular and responsible channel, and with that in view I have arranged with a thoroughly reliable New York banking house to handle this business for us."

Dr. E. R. Campbell, of Flint, has the matter in charge and preferred stockholders are requested to make prompt return of an agreement that is enclosed with the letter. They are informed that this plan will at all times protect their interests, the sole object being a proper and comprehensive handling of offerings of stock, to insure the best possible returns for stockholders desiring to sell.

# Coming Events.

November 3-13-Salt Lake City, Utah, Outdoor

November 4-Tampa, Fla., Reliability Contest,

Tampa A. C.

November 6—Start of Los Angeles (Cal.)

Phoenix (Ariz.) Road Race, Maricopa A. C.

November 6-13—National Automobile Show, un-

der the auspices of the N. A. A. M., at Atlanta,

November 6-17-San Antonio, Tex., Race Meet, San Antonio A. C.

November 8-9-Savannah, Ga., Highway Reliahility Contest, Savannah A. C.

November 9-13-Atlanta, Ga., Track Races, Atlanta Automobile Association.

November 11-Phoenix, Ariz., Track Race Meet. Maricopa A. C.

November 14-17-San Antonio, Tex., Four Day

Track Race, San Antonio A. C. November 20-21-New Orleans, La., Two Day Track Race, New Orleans A. C.

November 22-Flag-to-Flag Reliability Run, from

Denver to City of Mexico.

November 25-Redlands, Cal., Hill Climb, Mile Hill Climb Association.

December 12-San Antonio, Tex., Annual Endurance Contest, San Antonio A. C.

December 25 to January 1-Columbus, Ohio, Automobile Show Auditorium,

December 29-30—Philadelphia (Pa.) Annual Midwinter Endurance Contest, Quaker City M. C. December 31 to January 7-New York City An-

nual Show, Grand Central Palace, American Motor Car Manufacturers' Association.

January 8-15—New York Annual Show, Madison Square Garden, Association of Licensed Association

tomobile Manufacturers. January 17-24-Philadelphia, Pa., Automobile

Show, Second Regiment Armory.

January 24-29—Detroit, Mich., Automobile Show,

Wayne Hotel Gardens.

February 4-6-New Orleans, La., Annual Mardi Gras Speed Carnival, New Orleans A. C.

February 5-12-Chicago, Ill., Ninth Annual National Show, Coliscum.

February 14-19—Buffalo, N. Y., Auton Show, Broadway Arsenal, A. C. of Buffalo. February 19-26-Newark, N. J., Automobile

Show, Essex Troop Armory. February 19-26—Salt Lake City, Utah, Antomobile Show, Auditorium.

February 21-26—Binghamton, N. Y., Automo-bile Show, State Armory. February 22-26—Kansas City, Mo., Fourth An-nual Show, Convention Hall, Kansas City Automo-

bile Dealers' Association.

Barney Oldfield has purchased from the Knox Automobile Company a six cylinder machine which he intends to drive in stock chassis events. He is making a circuit of the Western States.



TY COBB IN THE CHALMERS CAR.



35 HORSE POWER SELDEN CAR.



#### Motor Fire Apparatus in Small Towns.

BY W. V. WOEHLKE.

During the last two years three of the smaller towns of southern California have purchased and operated motor propelled fire apparatus, and, after a thorough test of the efficiency and cost of the apparatus, the experiments have proven that, for towns from 2,000 to 25,000 inhabitants at least, the self propelled apparatus is a success. The cost of maintenance, it was shown in all instances, was less than 75 per cent. of the expense caused by horse drawn apparatus. the radius of action was larger and the emciency, measured by the speed with which the motor apparatus would reach the scene of a fire, left the performance of the old style machines far in the rear. These results appertain only to combination chemical engines and hose wagons, however, no self propelled pump having seen service in the towns in question, though one of them, encouraged by the success of the chemicals, is preparing to add a pumping engine to its equipment.

For a year a combination chemical engine and hose wagon, with the usual equipment of ladders, axes, hose and tools, besides a carrying capacity of eight men, has been in operation in South Pasadena. The apparatus was built by a Los Angeles assembling firm on a stock chassis of 128 inches wheel base, with a four cylinder, water cooled motor, capable of driving the machine at 50 miles an hour. Before the purchase the town relied for its fire protection upon two hose carts pulled by the volunteer firemen. On long runs no team can keep up the pace set by the motor apparatus, though on short distance runs the advantage is not so apparent. During the year the cost of operation and maintenance has averaged \$8 per month. Included in this amount is the cost of gasoline and oil, of cleaning rags, polisher and two repair bills. No allowance has been made for depreciation. The apparatus is taken out by the driver every day, and averages about 125 miles per month.

In Hollywood, a town of about 4,000, near Los Angeles, the cost of operation and maintenance for a similar apparatus for two years has averaged \$4.63 per month. In cleaning the machinery, warming up the engine three times daily, and in testing the engine in daily runs averaging 60 miles per month, about 25 gallons of gasoline, costing \$3.85, were consumed, while the monthly gallon of oil averages 75 cents. Repairs have not been necessary except minor adjustments made by the driver.

Long Beach, a city of about 15,000, two years ago replaced two teams of horses by motor propelled combination hose wagons and chemicals, both of them built on tour-

ing car chasses. Owing to more and longer runs, the monthly cost for gasoline and oil has been slightly more than \$5 per apparatus, while tire expenses and repairs added about \$13 monthly, making a total cost per month of \$18 for each chemical. Long Beach used up a set of tires in two years, while the tires on the Hollywood apparatus seem to be good for another year after having served twenty-five months. In all of the four engines mentioned the tires are subjected to undue strains, owing to the faulty distribution of the weight. Since the wheel base of all the machines is comparatively short, the weight of the hose, the ladders, tools, chemical tanks and firemen rests mainly on the rear axle, while the front axle has to support but the weight of the motor and the driver and his assistant. By a lengthened wheel base and better load distribution the life of the tires could be increased.

Long Beach is the only town furnishing figures comparing the cost of maintaining and operating the two motor fire engines with the cost of the two teams formerly employed in doing the work. While the monthly cost per motor engine averaged approximately \$20, the teams made necessary an expenditure of \$31 per month each. For four horses the expenses in a year were \$758.80, divided as follows:

Depreciation and interest on the investment in both horses and motor apparatus are not included in the statement. The fire commissioners of the three towns all declare, however, that a charge of 15 per cent. on the original investment will cover depreciation, since the machines are well taken care of, inspected and tested for defects and weaknesses daily, and subjected to strenuous work but rarely. In consequence of the thorough test Long Beach intends to add a pump and a third combination motor to its equipment, while the town of Santa Monica is agitating for a bond issue of \$20,000 to replace its horse drawn apparatus with motor vehicles.

Conditions in southern California, however, are strongly in favor of the motor apparatus as against the teams. Feed, as seen by the statement, is exceptionally high, thus turning the balance of cost in favor of the motor. Though there are heavy grades to overcome, the motor apparatus is never hampered by snow drifts or icy surfaces, and even in rainy weather the oiled roads and streets of the smaller towns make possible high speed in responding to an alarm.

#### Commercial Notes.

The sheriff of Milwaukee County, Wis., is to have a new automobile, to cost \$4,000, under an appropriation just made by the Board of Supervisors. The car will be

equipped with an ambulance body, which has been sorely needed.

It is reported that Fire Chief Salter, of Omaha, Neb., intends to ask the city council to provide automobiles for himself and assistants.

T. J. Neville, Charleston, S. C., has started a "Seeing Charleston" automobile service. He is operating one car, which starts from the Charleston Hotel every day at 10 o'clock a. m. and 3 o'clock p. m.

The city of Milwaukee, Wis., has selected another Rambler for official use, the city engineer's office being given a Model 54, at \$2,500. Milwaukee now owns fifteen or more official cars, and has spent in 1909 alone the sum of \$30,000 for automobiles.

An automobile truck line for freight and passengers, to be operated on Saturdays and Sundays only, is the plan of County Clerk Henry Falk and Frank Day, a leading business man of West Bend, Wis. The line would run between West Bend and Hartford, Wis.

At the recent National Dairy Show in Milwaukee, a motor propelled milk wagon was exhibited, with a capacity for carrying 800 pounds over any kind of roads. The wagon is designed for carrying nine milk cans, and is said to be capable of a maximum speed of 30 miles per hour.

The Conrad Land and Water Company, of Conrad, Mont., who are using a twenty-two passenger motor bus in their land business, have fitted the car with flanges on the four wheels, so as to adapt it for use on railroad tracks. The experiment is said to have proven entirely satisfactory.

The Friendship Fire Company, of Phœnixville, Pa., has been supplied with a motor propelled combination wagon, which is to be housed in a new structure on High street. The combination wagon is of Knox make. It is equipped with chemical tanks, hose and ladders, and in addition will carry fourteen men. The car cost \$5,000.

Columbus, Ohio, will soon have a taxicab service if the promises of the Columbus Tax-I-Cab and Auto Livery, located at 37 South Scioto street, are carried out. It is announced that three taxis will be placed in service in a week and three more in less than a month. The taxicabs will consist of Stevens-Duryea chasses, with bodies manufactured by the Barndt-Johnson Company, of Columbus.

Barclay & Brandon, an undertaker's firm of Atlanta, Ga., have placed an order with Crane & Breed, of Cincinnati, for a motor propelled ambulance, equipped with a 30 horse power motor, and designed for a maximum speed of 30 miles per hour. A novel feature of the ambulance will be that it will not bear the name of its owners, but instead a series of name plates will be carried, including the list of all the hospitals in the city, and whenever a call is received to go to a certain hospital the name of that hospital will be displayed on both sides of the ambulance beneath the words Emergency Hospital.



#### Recent Decisions.

STATE ENGINEER CANNOT DEMAND DEPOSIT FOR USE OF ROADS.

Under New York Motor Vehicle law, prescribing the rate of speed, and Subdivision 6, authorizing local authorities to set aside for a given time a specified public highway for speed tests or races, and Section 12, authorizing the State Engineer to make such rules as are necessary for the protection of the highway, it was held that the State Engineer had no authority to make a rule requiring a deposit with the State Engineer and Surveyor of \$200 per mile for each mile of said road to be raced over for each day of said race. It was further held that the State Engineer could not revive the law which the Legislature had given the local authorities power to suspend, and which they had suspended. Where the local authorities gave their consent and imposed no conditions, there is nothing in the statute to show that the consent of the State Engineer and Surveyor had to be obtained before the race could be run, and he had no authority to exact a deposit.-Morrell vs. Skene, 64 Misc. 185.

VEHICLE HEIGHT LIMIT IN PARKS

Where a party drove a double-deck omnibus which exceeded the prescribed height by more than a foot, provided for by the ordinances and regulations of the public parks of New York, which prohibited the use of a vehicle measuring over 10 feet from the tread to the highest part, it was held that the regulation was reasonable and within the power of the Park Department, under the New York Revised Charter, to prohibit the same in the parks.—People vs. Shellenberg, 133 App. Div. 79.

CONFLICT OF EVIDENCE.

An automobilist was driving in a city at about 10 miles an hour and reached the junction of another street before another vehicle, after dark, and made the turn and collided with a horse and buggy. There was some conflict of evidence as to whether the auto kept to the right hand side of the intersection of the streets in making the turn, and whether or not plaintiff's buggy was in the proper place when the collision took place, and on this conflict of evidence the finding of the trial judge in favor of the plaintiff would not be disturbed.—Schoening vs. Young. Wash., 104 Pac. 132.

This was an action against the automobile owner for damages and judgment was for plaintiff.

# Joy Rider's License Suspended.

The Massachusetts Highway Commission has suspended the license of Alexander O. Anderson, a Boston chauffeur, for one month, as the result of a complaint made against Anderson by Thomas D. Claffin.

Mr. Claffin brought his car to a repair shop and gave explicit orders that it was not to be taken out of the shop for any purpose in his absence. Anderson put in the defence that he had the car out for a test, and that he did not know of the orders left by Mr. Claffin. The board did not see it that way, however, and issued the following opinion:

"The use of a motor car on a trip of 150 miles, mostly after dark, for the purpose of testing it, is not within the express or implied authority which can reasonably be attributed to persons intrusted with the repair of other persons' cars, and such a use is improper and unauthorized," was the comment made by the Highway Commission. Continuing further, the board explained its action as follows:

"The board imposes this light penalty because it is the first case of this kind which has come before it, and it realizes that many repair men and chauffeurs have thought that they had implied authority to use other persons' cars in this manner, but the board feels that this practice should be stopped, and that the testing of cars by repair men and others when the owner is not present should not be carried beyond reasonable limits, and that certainly a trip of 150 miles is far beyond a reasonable limit."

# Milwaukee Curb Standing Act Rescinded.

Automobiles may occupy Grand avenue and Wisconsin street, the main thorough-fares of Milwaukee, Wis., between the hours of 9 p. m. and 5 a. m., hereafter. The Milwaukee common council recently issued an order prohibiting any automobile from occupying any part of these streets longer than to let passengers alight or embark, but as traffic during the night is not heavy and the order caused much discomfort among theatregoers, taxicab operators and professional chauffeurs, it was deemed unwise to enforce the order during these hours.

Cushion Spring Patent Sustained.

The D'Arcy Spring Company, of Kalamazoo, Mich., have been granted an injunction against the Jackson Cushion Spring Company, of Jackson, Mich., restraining the latter from infringing Patent No. 785,410, owned by the D'Arcy Company. The injunction was issued by the United States Circuit Court for the Eastern District of Michigan, on October 6, 1909, after five years' litigation.

# Enforcement of Limited Non-Resident Exemption Clause Difficult.

Some apprehension is being felt in Pennsylvania as to the possibility of enforcing that section of the new law which goes into effect New Year's, which exempts non-resident motorists from registration in Pennsylvania, provided the home States grant similar privileges, for a period of ten days. The Highway Department, after securing legal advice, decided that all it can do is

to notify local authorities of the terms of the law, and leave its administration to them. How the local authorities are to determine whether a car has exceeded its period of grace is left an open question.

National Legislative Convention in Washington.

Charles Thaddeus Terry, chairman of the legislative board of the American Automobile Association, announced last week after a conference with the National Association officers that the first National Legislative Convention, under the auspices of the A. A. A., will be held in Washington during the middle of January. Plans are now under way to invite the Governors of all the States in the country, and in view of the increasing interest in the subject of good roads throughout the Southern and Far Western States it is believed that the delegations from these localities will be particularly large. It has been found that wherever the good roads subject becomes prominent it is at once followed by a demand for better laws regarding the use of the highways. The two chief matters that will be brought before the coming national convention will by the National Registration Motor Law and the Uniform State Law. The National Reg istration Act will be reintroduced into Congress by Congressman Cocks, who had charge of the bill last year, and it is proposed to secure a hearing upon the bill before the Judiciary Committee during the time of the convention in Washington.

## Legal Notes.

At a joint meeting of the St. Louis Automobile Dealers' and Manufacturers' Association and the A. C. of St. Louis on October 21 it was decided to jointly work for the adoption of the new traffic ordinance which was drafted by the club.

Attorncy General Byers of Iowa, in discussing his recent ruling that liability insurance for motorists is invalid in Iowa, states that motorists can get the same insurance as all other employers; that is, while they cannot insure themselves against liability for damages caused by their own recklessness, they can insure themselves against liability for damages caused by their chauffeurs.

## **Business Troubles.**

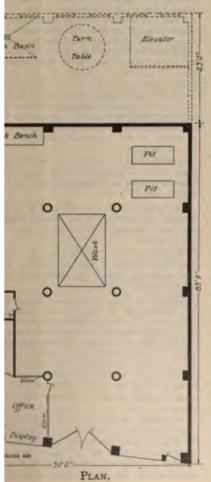
Suit for a receiver for the Auto Motor Company, of Cincinnati, Ohio, and for an accounting has been brought by William L. Divine, a stockholder. Complainant alleges that during the year ending January, 1908, the company did a business of \$100,000, but at a loss of \$8,000. Then a new board of directors and a new manager were appointed, and it was agreed, he alleges, that if at the end of six months the company was not being operated at a profit the manager should be replaced; nevertheless, although the company has ever since been conducted at a loss Reuben Payne has remained in charge.

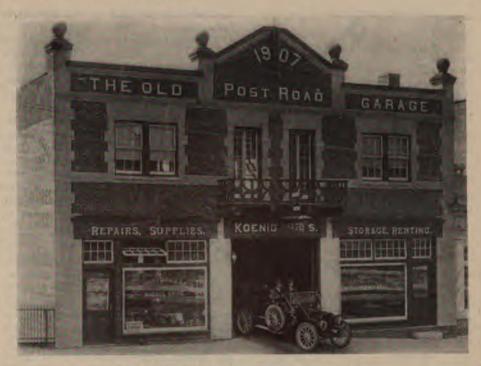
# Tarage Items

# Old Post Road Garage, Tarrytown, N. Y.

establishment, located on North lway, Tarrytown, N. Y., is one of the modern of the out of town garages s section of the country, and is cenlocated in that city, so that it is very nient for local patrons as well as for ts over the Old Post road leading New York to Albany. The cut shows scade of the building. The entrance ars is through large double swinging in the centre, and at either end are doors, the one at the left leading to airway to the second floor. The buildas two stories and basement, but at nt the second floor is unfinished. The is at the front, to the left of the en-, and is also used as a salesroom for es; it has a small display window deto accessories, and is very plain and esslike in its furnishings.

e building has brick walls and reind concrete floors and columns; it is 50 broad by 85 feet deep, but the propriepropose to make an addition to the 25 feet in depth, in the near future, it the same time increase the height by story. The windows at the front and car portion of the left side furnish am-





THE OLD POST ROAD GARAGE, TARRYTOWN, N. Y.

ple light during the day, and at night incandescent electric lights, liberally distributed, furnish ample illumination. The main floor is used principally for storage, and the two rows of columns shown in the floor plan divide this naturally into a central runway, with a storage space on either side. This floor will accommodate about thirty cars on storage, and in the basement about ten more can be taken care of. Very few cars are carried on dead storage, except in the winter. At the time of the writer's visit there were about thirteen cars on live storage, and two on dead storage, besides those in use.

The basement floor has an entrance for cars from another street, and about two-thirds of its space, at the rear, is devoted to repair work, and the remainder to storage. A steam heating plant is employed, there being wall coils near the floor around the entire main floor, and on the ceiling in the basement. The construction of the building being as nearly fireproof as can be imagined, the proprietors have not thought it necessary to install an elaborate fire alarm system, but a liberal supply of dry powder extinguishers and a few carbonic acid automatic extinguishers are distributed about the building.

Directly back from the office is a supply stock room, where a very complete line of tires and standard repair parts of all kinds is carried. A 1,000 gallon gasoline storage tank is located 4 feet below the basement floor, and is furnished with a Bowser pump for pumping the gasoline to where it is needed. Lubricating oil is kept in portable cans. Two grades, medium and light, are kept in stock.

At present there are two wash pits, one in the basement and one on the main floor, with overhead water connections. The repair shop in the basement is equipped for a variety of machine work. Power is supplied by a 5 horse power electric motor, and the tools include a 14 inch by 8 feet Flather tool room lathe, a No. 13 Garvin miller, an 18 inch Garvin drill press, a small Pratt & Whitney sensitive drill and two grinders. A small planer will soon be installed. A 4½x4½ inch Gardner air compressor with separate motor drive supplies inflating air through a 10 cubic feet storage tank. The proprietors make a specialty of tire repairs, and the equipment for this work includes a tube vulcanizer, a sectional vulcanizer and a steam cauldron, with a small vertical boiler

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ACTUAL SIZE 4x91/2 INCHES HIGH.

to supply high pressure steam for the same. Two men are regularly employed on tire work and sometimes more. During the winter season a specialty is made of complete overhauling and repainting.

A set of lockers is provided on the main floor for the use of patrons, but the keys for same are kept in the office, so as to keep all responsibility with the management. It is proposed to arrange chauffeurs' quarters and rooms for ladies on the second floor.

Very few electrics are handled, but there is a Cooper-Hewitt charging outfit for recharging vehicle batteries. A complete

# OLD POST ROAD GARAGE.

Koenig Brothers, Props.

BATTERY RECHARGING DEPT.

OLD POST ROAD, TARRYTOWN, N. Y.

Telephone Call 400.

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OLD	POST ROAD GARAGE,					

Telephone Call 400.

ACTUAL Size 3x5¼ INCHES High.

SATTERY RECHARGING DEPT.

OLD POST ROAD, TARRYTOWN, N. Y.

equipment for charging ignition batteries is provided.

No checking system has yet been used for supplies or gasoline, and the proprietors state that they realize that this is responsible for a very considerable loss. On repair work a duplicate check system is in use, and samples of the checks are shown herewith.

A considerable amount of renting business is done, three cars of the regular touring type having been used for this the past season. Provision is made for sending emergency repairs or supplies to customers who telephone in for the same. The Rambler cars are handled by the proprietors, Koenig Brothers, but no display cars are carried in stock.

# Brooklyn Dealers Plan to Organize.

Dealers of Brooklyn, N. Y., held an informal meeting for the purpose of organization at the Allen-Swan Company's establishment, at 1384 Bedford avenue, on October 27. A temporary organization was effected last year in order to give force to the dealers' opposition to the Long Island automobile show, then contemplated. The association has not been active since that time, but its officials presided at the meeting held last week, at which the proposal to make the organization permanent was discussed. A committee of three, consisting of C. M. Bishop, Lew H. Allen and I. C. Kirkham, was appointed to call on the regular dealers not attending the meeting and get them to join the organization. Another meeting is to be held at the same place in two weeks, when the organization will probably be completed and definite plans decided upon.

## Ohio Dealers Victims of Swindler.

William L. Offenbaugh and George W. Miller, proprietors of the Central Ohio Motor Car Company, of Columbus, Ohio, came close to being defrauded out of a motor car by a slick, paroled Mansfield Reformatory prisoner named James Fuller. Fuller represented himself as Jack Remington, son of wealthy parents, who desired to purchase a motor car. The proprietors defrayed his expenses to the factory at Pontiac, Mich., where a car was selected and a check tendered in return. Later, while attempting to purchase a diamond the identity of "Remington" was discovered. By quick work the car was kept from falling into Fuller's hands.

# Atlanta Garage Rates.

The garage owners of Atlanta. Ga., in anticipation of the coming show and track events there have reached an agreement with regard to rates to be charged for storage and supplies. The charge for storing a car for twenty-four hours is to be \$1.50; that for cleaning the machine \$1; gasoline is to be sold at the regular price of 15 cents per gallon, and oil and supplies are to be charged for at regular rates.

#### Garage Notes.

LAFAYETTE, O.—A concrete garage is being built for H. P. Maus.

GREENWICH, CONN.—A garage is being built on Campbell Smith's property.

BRATTLEBORO, VT.—Charles O. Robbins is building a garage on Chapin street.

EAST ROCHESTER, N. Y.—George A. Jacobs is building a garage on Main street.

MILLERS FALLS, MASS.—John D. Lynch will build a garage on Newton street.

MILTON, MASS.—W. M. Bean is building as addition to his garage on Main street.

WARSAW, N. Y.—Samuel J. Crawford will build a garage in the rear of his store.

BUFFALO, N. Y.—Warner & Bacheller will build a one-story frame garage at 94 Beard street. WORCESTER, MASS.—The Spencer Wire Company are building a garage on Webster street. NEW YORK, N. Y.—James Deering will open a three-story garage at No. 233 West 79th street. GRAND RAPIDS, MICH.—David Stoll is to build a one-story frame garage at 399 West Bridge

ST. LOUIS, MO.—J. Hill, of 5916 West Cabanne street, has been granted a permit to construct a garage.

street.

BUFFALO, N. Y.—The Cataract Power Company will build a one-story brick garage on Front street, to cost \$4,000.

PHILADELPHIA, PA.—F. A. Havens & Co. have filed plans for the erection of a garage on 48th and Chestnut streets.

ST. JOHNSBURY, VT.—Ground has been broken for the erection of a garage for C. H. Goss Company, on Central street.

NEW YORK, N. Y.—A new one-story garage is to be built for Engene Higgins at Nos. 182-184 West 230th street, to cost \$2,000.

West 120th street, to cost \$3,000.

TRENTON, N. J.—Harry J. Stout has bought the Central Garage, off East State street. He will handle the Pullman car exclusively.

PHILADELPHIA, PA.—Camille Gemehl has bought two garages at 1608-1610 Chancellor street from A. E. Borie for \$17,500.

PHILADELPHIA, PA.—Irwin & Leighton have obtained a permit for the construction of two large garages on Broad and Callowhill streets.

PHILADELPHIA, PA.—Work has been begun on a one-story garage for B. Ruckdeshel in the rear of 4034 Girard avenue, to cost \$5,000.

MANKATO, MINN.—D. D. Cummins & Ca, of South Front street, have moved their garage to W. H. Hammett's building on Walnut street. NEW BEDFORD, MASS.—Harold B. Grinnell,

NEW BEDFORD, MASS.—Harold B. Grinnell, 76 Cottage street, has applied for a permit to build a garage at the corner of Grove and Cottage streets.

MINNEAPOLIS, MINN.—E. W. Simpson has taken over the automobile repair shop and livery business located at Fourteenth street and Hempenin avenue.

PHILADELPHIA, PA.—Stearns & Castor have awarded the contract to the Wayne Construction Co. for a garage on Broad street, near Germantown avenue.

MINNEAPOLIS, MINN.—M. R. Waters & Son have obtained a lease on property at Laurel and Hennepin avenues on which they will erect an automobile building.

NEWARK, N. J.—The Square Garage Company of Brooklyn, N. Y., have opened a branch garage and repair shop at 489 Washington street, Newark, N. J. Ralph Blake is manager of the new branch.

CHICAGO, ILL.—The Anderson Carriage Company of Detroit have taken a fifteen years' lease on a two-story automobile building now in course of construction on Michigan avenue, north of a6th street. The front of the building will be of white enamel with green trimmings. It will cost \$40,000.

NEWARK, N. J.—Ground has been broken for the erection of a 70x130 feet pressed brick garage on Somerset and Barclay streets. Features of the new structure will be two large showrooms, a vacuum cleaning outfit, steam heat and all soders conveniences. Messrs. Paddock & Zuzi will secupy the new building, in addition to their present quarters on Clinton avenue.

SEATTLE, WASH.—The Couple-Gear Truck Co. are now located at 1927 First avenue South.

BALTIMORE, MD.—The Dixon C. Walker Auto Co. are having plans prepared for the erection of a garage at the southeast corner of Charles and 20th streets.

READING, PA.—H. F. Hoffer & Sons will conduct a garage and repair shop at 532 Cherry street in addition to their establishment at 126 South Tenth street and 422 Court street.

BOSTON, MASS.—The Regal Motor Company have taken possession of the salesrooms formerly occupied by the Auto Motor Company at 11 Park avenue. A. W. Mutty is sales manager.

avenue. A. W. Mutty is sales manager.
WILMINGTON, DEL.—A permit has been granted to C. R. Holt for the erection of a two-story 52x60 feet garage on Tatnall street, between 8th and 9th avenues. The estimated cost is \$6.000.

COLUMBUS, O.—The Maxwell-Briscoe Motor Company of North Tarrytown, N. Y., will open a garage at 62 East Spring street. The company intends to make Columbus one of its central distributing points.

tributing points.

BUFFALO, N. Y.—The Buffalo Auto Co.'s garage, at 1127 Main street, was damaged by fire on Oct. 20th to the extent of \$700. Spontaneous combustion in a pile of oil soaked waste is supposed to have been the cause.

ATHENS, GA.—Bishop & Flaton expect to occupy their new fireproof garage, now in course of construction on Washington street, about the first of the year. They will handle a full line of Maxwell, Pullman and Stoddard-Dayton cars.

INDIANAPOLIS, IND.—The Rambler agency in Indiana, which has been held by the Hearsey-Willis Co., has been taken over by the newly organized Rambler Auto Co., who are looking for a suitable location in the downtown district.

CHICAGO, ILL.—Plans are being prepared for the erection of a four-story building on the west side of Michigan avenue, south of 23d street, to cost \$100,000. The Baker Electric Vehicle Company will occupy the building after completion.

SEATTLE, WASH.—W. H. Heinzerling, formerly manager of the Fred A. Bennett Seattle branch, has bought out the latter's entire interest, and will locate at 1420 Broadway. He will handle the Renault, Reo, Great Smith and Rapid Commercial.

VINCENNES, IND.—J. F. Lanhan and B. T. Whitehouse have opened a permanent school of automobile engineering and instruction at the Wabash garage. J. F. Lanhan will give instruction in repair work, while B. T. Whitehouse will act as road instructor.

PHOENIX, ARIZ.—E. P. Stafford has severed his connection with the Central Auto garage and will establish a garage of his own at the corner of Second and Adam streets, in the building formerly occupied by Kunz Bros. He will conduct a general repair shop.

ALBANY. N. Y.—A garage is to be built for J. A. P. Ketchum, of Saratoga, on Washington avenue and Northern Boulevard. The plans call for a two-story building of marble and bronze, fronting 66 feet on Washington avenue, and 145 feet on the Northern Boulevard.

MARINETTE, WIS.—The Isham Motor Car Co. is the name of the reorganization of the Thayer-Isham Motor Co., agents for the Studebaker and Maxwell. Harry A. Thayer has withdrawn in order to enter business at Los Angeles, Cal., and O. R. Isham will continue the business.

SEATTLE, WASH.—The Woods Electric Vehicle Co. have entered the Seattle field, being represented by Carl J. Metzger, Jr., formerly sales manager for the Woods Company in Chicago. It is the intention of the Woods Co. to build a new brick garage in a fashionable residential section of Seattle, to be opened on or before January 15. I RUTLAND, VT.—The Rutland Garage Company are planning to build a three-story, 100x125 feet, reinforced concrete fireproof garage on the south side of Willow street. The first floor will be used for general storage purposes. The second floor, the entrance to which will be on Center

street, will have a large office, a show room, and a waiting room for patrons.

WILMINGTON, DEL.—Webb & Robinson are having a garage built on Railroad avenue.

WICHITA, KAN.—The Wichita Automobile Co. have purchased a 100 foot plot on the southeast corner of Lawrence and English avenues. HOUGHTON, MICH.—Plans are being drawn

for a new garage for the U. P. Motor Car Co., a branch of the Duluth Motor Car Co., Duluth, Minn.

WABASH, IND.—The Motor Inn Co., recently incorporated, will open a garage in the Mote Building. They have secured a five years' lease, and are remodeling the building.

CLEVELAND, OHIO.—Work has been begun on the Zimmerman Realty Company's garage on Euclid avenue and East Sixty-fifth street. The building is to be one story, 60x150 feet.

HOBART, OKLA.—D. A. Scott is president and general manager of the newly organized Scott Automobile Co., which will immediately erect a garage and conduct a general automobile agency and garage business.

WHEELING, W. VA.—E. J. Becker, who has severed his connection with the House & Becker garage, has joined forces with George Row, and will open a garage on Eleventh street, between Market and Main streets.

WALLA WALLA, WASH.—Mr. Hunt, of the Gilbert-Hunt Co., and B. C. Holt, of the Holt Manufacturing Co., both of Walla Walla, have tormed a copartnership for the purpose of handling the "Winton" Six in the northwestern part of Washington.

COLUMBUS, OHIO.—C. Roy Clough, manager of the Columbus (Ohio) branch of the Charles Schiaer Motor Car Co., has placed the following sub-agencies for the Hupmobile in Ohio: Wapakoneta, Hause & Bittle; Hamilton, Hamilton Motor Car Co.

CHICAGO, ILL.—A new automobile building, which when completed will be occupied by the agency for the Detroit electric car, is at present being erected on the local auto row. It will be two stories high, 45 feet wide and 190 feet deep, and have a façade of Florentine renaissance design.

FORT WORTH, TEX.—The Texas Motor Sales Co. will open a sales establishment here immediately after the Dallas Fair. They will handle the Cole "30" and the Marmon. H. E. Crowley is president of the company, Ira W. Word, of Senora, Tex., vice president, and J. O. Wright, of Dallas, secretary and treasurer.

DULUTH, MINN.—The Duluth Motor Car Co. have leased the ground for a new garage building to be erected this fall. The building will be two stories high, 50x140 feet, and will be complete in every detail, with chauffeurs' room and separate repair rooms for gasoline and electric cars. The location is on Superior street, and the estimated cost is \$30,000.

BOSTON, MASS.—Edward Paul, an automobile repair man, while taking a car up to one of the upper stories in the Motor Mart Building, inadvertently backed his car back into the elevator shaft, after having just left the elevator, and fell three stories, the car falling on top of him. Paul suffered numerous contusions and lacerations, besides a fracture of the left side of the skull, but it is thought that he will recover.

MARSHFIELD, WIS.—One of the largest garages in northern Wisconsin is now being constructed for Lang & Sherman, proprietors of the Marshfield Iron Works, recently appointed agents for the Maxwell. The garage will be 30x80 feet in size, with a capacity of twenty cars, the Maxwell order for 1910 delivery. The Iron Works manufactures the Paulson gasoline motor, and has produced several complete cars equipped with this motor.

OSHKOSH, WIS.—Zimmer & Malchow, who recently purchased the business of the automobile department of Gottfredson Brothers, wholesale hardware dealers at Green Bay, Wis., have organized under the style of the Green Bay Motor Car Co. The Gottfredson garage has been leased, and improvements are now being made which will make it 60x100 feet in size, with a repair shop of

21x44 feet. A large elevator will be installed in the building.

FLORAL PARK, L. I.—John Lewis Childs is building a concrete garage,

CAMBRIDGE, MASS.—The old Porter House is to be converted into a garage.

ELDORA, IA.—J. H. Hadley will soon erect a 50x120 foot cement garage and salesroom.

COLUMBUS, OHIO.—J. M. Hammil is having plans prepared for the construction of a garage in Bulitt Park.

SAGINAW, MICH.—The Buick Auto Supply & Garage Co., recently incorporated, have opened offices in the Bearinger Building.

BALTIMORE, MD.—The Motor Car Co. are preparing plans for improvements to their garage on Mount Royal and Maryland avenues.

HACKENSACK, N. J.—Charles Henderson is having a garage built on Prospect avenue and Golf place. The cost is estimated at \$8,000.

PITTSBURG, PA.—The William Zoller Co. have been granted a permit to build a one story brick garage in the rear of 346 Spring Garden avenue.

UNIONTOWN, PA.—The Tri-State Garage Co., newly organized, have leased the building formerly occupied by the Fayette Automobile Co. on Fayette street.

SAN ANGELO, TEX.—The Buick Auto Supply Co. will move from their present quarters in the Shubert Building to the Hatton & Riley Building this week.

LYNN, MASS.—Work has begun on the new Eastern Avenue Garage, next to Perkins' carriage factory. The structure is to be one story, 35x50 feet, with a concrete block front.

LYNN, MASS.—A garage is in course of erection for M. E. Sibley on land formerly owned by Henry O. Newhall. The building will be 71x101 and will contain a storage space and a repair shop.

WILMINGTON, DEL.—Clarence R. Holt, of East Fourth street, will conduct an automobile livery in addition to his hotel business. A garage to cost \$8,000 will be erected at 521 Tatnall street for the purpose.

GOSHEN, IND.—Teagarden & Putt have doubled their floor space by the addition of two more rooms. They will install a charging plant for electric machines. The north room will be used as a salesroom

TWIN FALLS, IDAHO.—T. W. Naylor, who has charge of the Boise (Idaho) branch of the Studebaker Brothers Automobile Co., has been in this city with a view to locating a branch here the coming winter.

the coming winter.

ALBANY, N. Y.—W. L. Schupp & Sons have let a contract for the erection of a two story brick addition to their garage on Bradford street. The lot is 43 feet wide on Bradford street by 52 feet deep. The plans provide for a driveway within the completed building from Bradford street to Central avenue. The first floor will be used for storing and cleaning, and the second will be equipped as a repair shop.

COLUMBUS, OHIO.—A. J. Pray, who has taken the agency for the Studebaker and E-M-F line in central and southern Ohio, and who has opened a salesroom on North Fourth street, Columbus, has closed sub-agencies as follows: Forsythe & MacElwane, Newark; Martens Hardware Co., Lancaster, and Turner & Rausch, Marysville. Forsythe & MacElwane, of Newark, are constructing a \$10,000 garage building on Tenth street in the rear of the Auditorium. They have now a temporary location, but are expected to occupy the new building about Christmes.

the new building about Christmas.

JAMESVILLE, WIS.—Robert Groshung was arrested here, charged with the theft of about \$100 worth of tires, spark plugs and other accessories from the Otto automobile supply store in Madison, Wis., which he sold to several Jamesville garages. The stolen goods are said to have been brought to Jamesville in an automobile by a man named Syke, and some of them are alleged to have been found in his room in the Y. M. C. A. Building, but Syke maintains that he was not aware how Groshung got possession of the goods.



The Midland Motor Company, Moline, Ill., have advanced the price of their Model L car from \$1.750 to \$1.800.

The new Atlanta (Ga.) branch store of Charles E. Miller is located at 66 Edgewood avenue, and was opened on November I. From this branch the Southern States are to be covered.

The Peru Auto Parts Company, Peru, Ind., a branch of the Salisbury Wheel Company, of Jamestown, N. Y., have secured a large order from the Overland Automobile Company, and will begin operations next month.

An addition has recently been made to the factory of the Woods Motor Vehicle Company in Chicago. Ill., which now has 160,000 square feet of floor space, and is claimed to be the largest factory devoted exclusively to the manufacture of electric vehicles.

The Sternberg Manufacturing Company, of Milwaukee, Wis., manufacturers of automobile trucks, will occupy its new factory, now under construction at West Allis, the manufacturing suburb, on May I. Contracts have been awarded for construction work. The plant will cost \$60,000.

According to a report from Chicago the loss ratio on automobile insurance is increasing, and the Lloyds of London, who have been holding aloof from entering into an agreement with the local companies regarding rates, are becoming disposed to cooperate with them in this matter.

The Lakewood Chemical Company, of Cleveland, Ohio, are manufacturing a preparation for removing the carbon deposits on combustion chamber walls and piston heads of automobile motors. S. W. Watterson, a member of the firm, is at present establishing agencies for the product in the East.

The Gibson Automobile Company, Indianapolis, has purchased the first automobile manufactured by the Premier Motor Manufacturing Company. It is a two cylinder, water cooled car, and was formerly owned by J. Edward Krause, an Indianapolis hotel man. The car has many of the features that are still retained in the Premier cars.

The vacation of certain streets and alleys asked for by the Toledo Motor Car Company (the Overland Automobile Company) has been conceded by the authorities of Toledo, Ohio. It is the intention of the Overland Company to erect additional buildings on these streets which run through the property of the company.

The Goodyear Tire and Rubber Company, of Akron, Ohio, have just closed with the Buick Motor Company, of Flint, Mich., what is considered to be the largest contract for tires that has ever been placed. The Goodyear quick detachable tire and rim will be the regular equipment on all Buick cars for 1910, and the contract covers the

entire complement of tires required for the whole 1910 Buick output.

The first car turned out by the Worth Motor Car Company, of Kankakee, Ill., a twelve passenger sightseeing vehicle, has just been completed and submitted to its initial road test.

The Studebaker Automobile Company are at present conducting a private 2,000 mile sealed bonnet endurance run in a Studebaker E-M-F 30 through Ohio and neighboring States, which will end in Cleveland.

From figures on collection of stable refuse in Milwaukee, Wis., the secretary of the health department estimates that 50 per cent. less horses are used in Milwaukee this year than in 1908. The advance of the automolife is given as the most likely reason.

The Bristol Engineering Corporation, of Bristol, Conn., which manufactured cars for several dealers as well as taxicabs, has passed out of existence, the business having been taken over by the parent concern, the New Departure Manufacturing Company.

The Court of Appeals of Atlanta, Ga., will not sit during automobile week, November 8 to 15, all cases set for that week having been postponed until a week later. The action is said to have been taken for the accommodation of the lawyers interested, who might have had difficulty in securing suitable hotel accommodations.

The Star Rubber Company, of Akron, Ohio, hitherto known chiefly as a producer of druggists' rubber sundries, will combine the manufacture of automobile tires and inner tubes with their present business. The company has increased its capital stock from \$100,000 to \$250,000, and is adding an additional three story factory building, the first two floors of which will be devoted to tire manufacture.

The first of the 500 new automobile freight cars of the Santa Fe railroad arrived in San Francisco on October 14 with a double decked load of automobiles, consisting of six large touring cars. The freight cars weigh 48,000 pounds empty, are 50 feet in length, 10 feet in height, and 9 feet in width. They have a steel roof support, a steel end door and diagonal side doors 10 feet wide and the height of the car.

The Indiana Motor Sales Company has been organized in Indianapolis for the purpose of handling the output of the Indiana Motor and Manufacturing Company, which was recently organized and has established a factory at Franklin, Ind. The distributing company is capitalized at \$10,000, and is composed of B. F. Meixell, Donald J. Hayden and C. O. Britton. Mr. Hayden is secretary of the automobile manufacturing company.

The Automobile Owners' Mutual Protective Association, of which James M. Pierce is president and W. H. Springer secretary, are seeking to amend the articles of incorporation, changing from Chapter 9, of the Iowa State Insurance Law to Chapter 7 of these laws. Chapter 9 covers the

field of liability insurance, and Chapter 7 that of accident insurance. The step was taken in consequence of the recent ruling of the Iowa Attorney General to the effect that liability insurance on automobiles is invalid in Iowa.

The Hartford Suspension Company, whose works are located at 150 Bay street, Jersey City, N. J., inform us that they have an autogenous welding equipment in their factory, and have done considerable work in welding since installing it, as it is the only equipment of the kind in the vicinity.

The R. L. Morgan Company, of Worcester, Mass., has increased its capital stock from \$300,000 to \$1,000,000, consisting of \$500,000 7 per cent. cumulative preferred stock and \$500,000 common stock. It is stated that the company has in hand orders for more than 100 trucks, and it is planning in future to manufacture all of the parts itself, instead of having them made by outside firms.

The petition of William J. Connell to have the Concord Motor Car Company, of Concord, Mass., adjudicated bankrupt under the section relating to manufacturing has been adversely decided by the Circuit Court of Appeals, which reversed the decree of the District Court. The Circuit Court held that the repairing of automobiles, in which line of business the company was engaged, is not a manufacturing pursuit in the meaning of the bankruptcy act.

Two hundred agents of the Studebaker Automobile Company held their annual convention in Chicago last week. General Manager Hayden Eames, Col. George M. Studebaker, president of the company and E. Q. Cordner, manager of the Chicago branch, were in attendance. A banquet at the Auditorium Annex and a discussion on trade topics at the local salesroom, with an address by E. Le Roy Pelletier, were some of the features of the gathering.

The municipal campaign in Indianapolis closed with a number of "whirlwind" tours. an innovation in political campaigns, and which proved very successful. On these tours the candidates for mayor rode in automobiles covering from nine to twelve meetings in an evening and making five minute speeches at each. In one instance a brass band riding in four automobiles preceded the arrival of the candidate at each meeting, played a selection, and then while the candidate was speaking hurried to the next meeting.

At the annual meeting of the Standard Roller Bearing Company, of Philadelphia, held last week, the following directors were elected for the ensuing year: Lenox Smith, Wm. D. Sloane, Isaac H. Clothier, W. B. Osgood Field, Henry De Forest Baldwin, Edwin Packard, Herbert Du Puy, Edward B. Smith, John C. Winston, George H. B. Martin, James Boyd, R. S. Woodward, Jr. These directors formally elected the following officers for the ensuing year: President, Lenox Smith; vice president, W. B. Osgood Field: vice president and general manager, R. S. Woodward, Jr.; secretary and treasurer, W. M. Baldwin.

# Club Notes

The Gloversville (N. Y.) Automobile Club has decided to affiliate with the New York State A. A.

The Huntington (W. Va.) A. A. has joined the West Virginia State Automobile Association. The Huntington organization has a membership of 160.

The Utah Automobile Dealers' Association, recently organized, at a meeting on October 19 decided to hold its show in the Auditorium on Richard street, Salt Lake City, February 19 to 26.

The Quaker City Motor Club, of Philadelphia, Pa., plans to acquire a clubhouse. L. D. Berger, the president, and Allen Shelden have been named to head a committee on ways and means of financing the project.

The A. C. of New Haven, Conn., has started upon the work of erecting road signs in that part of Connecticut. The club has had 100 signs made, and is soliciting suggestions from local owners for suitable points at which to erect them.

The Knoxville (Tenn.) A. C., at a meeting held on October 13, passed a resolution indorsing the action of the Birmingham, Ala., Chamber of Commerce in agitating the construction of an automobile route beween the latter city and New York via Knoxville and Chattanooga.

The contest committee of the Bay State Automobile Association at the last moment abandoned the two days' endurance contest which was to be held on October 21 and 22. Only 14 cars had been entered, and this was thought insufficient to warrant the committee in proceeding with the contest.

The Anniston (Ala.) Motor Club was organized on October 12 at a meeting held in the Chamber of Commerce with a membership of forty-five. The officers elected are W. H. McKleroy, president; J. C. Sproul, vice president; A. S. Johnston, secretary and treasurer. The club will affiliate with the State and national organizations.

The Louisville (Ky.) A. C. held a meeting on October 14, at which the prizes in the recent endurance contest of the club were awarded, except the trophy for endurance. Eugene Straus was elected president of the club, to succeed J. F. Ross, who resigned because he will shortly leave Louisville. Mr. Straus was formerly secretary of the club.

The Chicago A. C. has begun an investigation of the manner in which the money collected in fines by justices of the peace and other magistrates in Cook County is being spent. The Illinois law provides that the fines collected from automobile speed offenders are to be paid into the treasury of the highway commissioners of the township in which the offense is committed, and that all moneys so received shall be used

in repairing and improving the roads within the township.

The A. C. of Maryland, Baltimore, Md., plans to hold its second annual show early in the winter. The club plans to send a representative to the Atlanta Show to interest the Motor and Accessory Manufacturers in its exhibit.

The Asheville (N. C.) Motor Club held its second meeting on October 19, at which twenty new members were admitted and a board of governors elected. President Sawyer and Vice President Reynolds were instructed to look for permanent headquarters for the club and report at the next meeting.

The Scranton (Pa.) Automobile Association held its third annual meeting in the Board of Trade Auditorium on October 26. The following officers were elected: J. J. Germyn, president; Harry J. Carr, vice president; Thomas Sprague, J. L. Connell and Stéwart Scott, members of the board of governors...

A meeting of the executive committee of the Michigan State A. A. was held in Grand Rapids last week, the object being to consider a proposition to have the State Association and the Grand Rapids Club conduct jointly the Grand Rapids road race, in stead of having the race held by the Grand Rapids Club alone under a sanction from the State Association. It is considered that the proposed arrangement would bring greater support for the race, especially from Detroit manufacturers.

The A. C. of Delaware County. Pa., held its annual meeting in St. Philomena's Catholic School hall in Lansdowne on October 19. The club, which has been in existence for three years, has 410 members. All of the old officers were re-elected, as follows: J. H. Weeks, president; W. P. Anthony, vice president; J. E. Mitchell, treasurer; Dr. F. Marshall Harvey, secretary.

At a meeting of the Lowell (Mass.) A. C. on October 19 it was stated that after all bills in connection with the Lowell Carnival had been paid, there remained a surplus of about \$2,000. It was decided to distribute this among the parties who had raised the guarantee fund of \$10,000. The net deficit of the event therefore amounts to about \$8,000. It was decided to pay \$100 to Lieutenant John Crowley, who fell and fractured his left arm on the closing day of the carnival.

The Cleveland A. C. held its annual meeting on October 26. The secretary's report showed a membership of 792, as compared with 724 in 1908 and 631 in 1907. It was decided to change the club constitution so as to make the club year begin on January I, and with this object in view an adjournment was taken to November 2, to give constitutional notice of the proposed amendment. To fill the vacancies caused by the expiration of the terms of three members of the board of trustees, Harry L. Vail was re-elected and Fred J. Baird and M. Lawrence were elected members of the board.



Washington, D. C.—Royce Hough, Buick. La Crosse, Wis.—Alfred James, Franklin. Lancaster, Wis.—Stevens & Clark, Cadlac.

Wheeling, W. Va.—R. H. Mahlke, Stude-baker.

Cheyenne, Wyo.— F. R. Dildine, Stude-baker.

Grand Forks, N. Dak.—J. W. Lyons, Franklin.

Vinton, Ia.—Vinton Automobile Co., Mitchell.

Quincy, Ill.—The Collins Plow Co., Rambler.

Chicago, Ill.—The Tennant Motor Co., Marmon.

Philadelphia, Pa.-Wm. P. Berrien, Stoddard-Dayton.

Oklahoma City, Okla.—The Central Motor Car Co., Overland.

Chicago, Ill.—Ralph Temple Automobile Co., Baker electric.

Columbus, Ohio.—The Reese Motor Car Co., Detroit electric.

Milwaukee, Wis.—Geo. F. Gerlach, 1520 Grand avenue, Baker electric.

Kansas City, Mo.—The Genung Motor Car Co., 1710 Grand avenue, Fal.

Cincinnati, Ohio.—The Imperial Motor Car Co., Moon, Gaeth and White.

Minneapolis, Minn.—M. L. Hughes, 109 Sixth street, Rauch & Lang electric.

Philadelphia, Pa.—Prescott Adamson, Broad and Spring Garden streets, Reo.

Cleveland, Ohio.—The Euclid Sales Co., Firestone-Columbus and Columbus electric.

Wheeling, W. Va.—The Wheeling Automobile Co., South Side, Buick and Oakland.

Des Moines, Ia.—The Patton & Van Vliet Automobile Co., Grand avenue, Studebaker.

Washington, D. C.—Lester D. Moore, Jr., Reo. (Also nearly all of the State of Maryland, excepting Cecil County; the northern part of Virginia and eastern part of West Virginia.)

# Unlicensed Makers May Join New Patent Combination.

According to a trustworthy source a big combination among unlicensed automobile manufacturers is at present being formed in Indianapolis with a capital stock of \$4,000,000. The nucleus of the new combine is a rear axle patent, which is claimed to be fundamental. Three of the most prominent men in the unlicensed ranks have been represented at the meetings held in Indianapolis by counsel, and all three will be there personally next Saturday. One of the largest axle concerns in the country is also said to be interested in the new combine. The rights to the rear axle patents have been secured by two promoters who have been interesting the various parties above alluded to.

# New Incorporations

The Bemb Auto Sales Co., Detroit.—Capital stock, \$10,000.

University Motor Car Co., Detroit, Mich. —Capital stock, \$100,000.

The Capital Auto Company, Des Moines, Ia.—Capital stock, \$10,000.

The Automobile Exchange, Salt Lake City, Utah.—Capital increased from \$5,000 to \$50,000.

The Mitchell Motor Car Co., Racine, Wis.—Capital stock increased from \$1,000,000 to \$2,000,000.

The Wood-Kessler Auto Co., Toledo, Ohio.—Capital stock, \$12,000. Incorporators, George N. Fell and others.

The Star Carburetor and Supply Co.. Woonsocket, R. I.—Capital stock, \$100,000. Incorporators. John J. Lace and others.

The Buckeye Motor and Cycle Co.. Akron, Ohio.—Capital stock, \$5,000. Incorporators, Lucien B. Lyman and others.

The Piedmont Motor Car Co., Atlanta, Ga.—Capital stock, \$10,000. Incorporators, S. A. Wardlaw, Wm. D. Alexander and W. O. Wilson.

The Indiana Motor Sales Co., Indianapolis, Ind.—Capital stock, \$10,000. Incorporators, B. F. Meixell, D. J. Hayden and C. O. Britton.

The Central Motor Car Co., Oklahoma City, Okla.—Capital stock, \$10,000. Incorporators, John N. Shepler, J. Niblo and J. A. Niblo, Jr.

The Albany Motor Car Co., Albany, N. Y. —Capital stock, \$5,000. Incorporators, J. B. Wood, J. A. Wendell, F. S. Snyder and Frank A. Snyder.

The Carter Carburetor Co., St. Louis, Mo.—Capital stock, \$12,000. Incorporators. W. C. Carter, C. O. Baxter, Alden H. Little and W. C. Carter,

The Baker-Cameron Automobile Co., Dallas, Tex.—Capital stock, \$30,000. Incorporators, G. W. Baker, R. L. Cameron and L. E. Woodsend.

The Frank S. Bump Co., Binghamton, N. Y.—To deal in auto supplies. Capital stock, \$10,000. Incorporators, F. S. Bump, Austin S. Bump and Mona L. Bump.

The Harriman Garage Co. of Roane County, Tenn.—Capital stock, \$5,000. Incorporators, M. W. Thornton, M. Stowers, E. M. Kennedy, L. O. Scott and J. W. Scott.

Woodsdale Motor Car Co., Woodsdale, W. Va.—Capital stock, \$5.000. Incorporators Joseph Speidel, Jr., F. McL. Speidel, J. W. Speidel, B. S. McLure, and W. G. Caldwell, of Wheeling.

The Cushnoc Motor Co., Augusta, Me.—Capital stock, \$50,000. Incorporators, W. P. Cummings, Hallowell; C. B. Burleigh, Abner W. Nichols, P. H. Fitzgerald, Wm. Skehan, of Augusta.

The H. E. Wilcox Motor Car Co., Minvieapolis, Mir.n.—Capital stock, \$1,000,000. Incorporators, R. E., J. F., R. D. and F. E. Wilcox, G. W. Lewis and W. R. Cary, of Minneapolis, and D. H. Davidson, Jr., Carrington, N. Dak.

# Trade Personals

B. H. Pratt, of Fisk Rubber Co., who has had charge of the sales at Chicopee Falls, Mass., will in the future be manager of the Pacific Coast branch of the company.

W. G. ZAHRT, who has been manager of the general line sales department of S. F. Bowser & Co., Inc., Fort Wayne, Ind., has been placed in charge of the branch offices of that firm.

J. C. MATLACK, president of the Michelin Tire Co., of Milltown, N. J., has resigned. The resignation became effective November 1. Mr. Matlack will shortly announce his future plans.

J. H. McConnell has been appointed manager of the Fort Wayne general line sales department of S. F. Bowser & Co. Mr. McConnell was formerly assistant manager of this department.

HARRY BECK, Odd Fellows Temple Building, Broad and Exchange streets, Philadelphia, has been appointed secretary of the recently organized Philadelphia Garage Owners' Association.

A. E. VINTON has resigned his position with the G & J Tire Co., Indianapolis, with whom he had been for the past eight years. We understand that Mr. Vinton has several offers and will shortly announce his choice.

A. P. WARNER, president of the Warner Instrument Company, of Beloit, Wis., this week received his Curtiss aeroplane, purchased some time ago. He will make flights without expert assistance. The plane is the one used by Glenn H. Curtiss at the St. Louis centennial.

ERNEST A. Moross will sever his connection with the Indianapolis Motor Speedway Company, as director of contests, on November 14. It is reported that in the future he expects to devote his attention to promoting contests on various automobile courses, which his contract with the Indianapolis course prevented him from doing.

CAPT. WILLIAM MITCHELL LEWIS, president, and George B. Rogers, secretary of the Mitchell Motor Car Company, Racine, Wis., are on their way to Europe to attend the Olympia automobile show in London, following which they will tour the Continent and investigate the taxicab situation. They will also inspect the two European branches of the Mitchell, at London and Paris, which no member of the company has yet seen.

# Motor Vehicle Patents

Patents Issued September 7, 1904.

993,045. Water Circulating Pump.—Willian R. Andrew, Milwaukee, Wis., assignor to Interactional Harvester Co., a corporation of New Jesey. Filed March 25, 1909.

933,049. Vehicle Wheel.—Albert E. Beall and Charles F. Skellenger, Clinton, Ia. Filed June 19, 1908.

933,068. Power Transmitting Device.—Scend Fletchers, Traverse City, Mich. Filed March 13,

933,076. Shock Absorbing Apparatus.—Marie Houdaille, Paris, France. Filed March 1, 1995, 933,077. Gas Generator.—George F. Janhot, Paris, France. Filed April 28, 1908.

933,106. Tire Remover and Replacer.—Heary M. Owens, San Francisco, Cal. Filed June 16, 1908.

933,110. Tire Tread.—Charles L. Rempa, Akron, Ohio. Filed July 8, 1907.

933,115. Combination Spark Gap and Plag-Arthur L. Snyder, Pasadena, Cal. Filed May 15, 1907.

933,152. Tank for Storing Acetylene Gas-Percy C. Avery, Milwaukee, Wis. Filed August 27, 1906.

933,232. Power Transmitter.—Frank de Coligny, Chicago, Ill., assignor to Coligny Hydranic Transmission Co., a corporation of Michiga. Filed October 21, 1908.

933,233. Hydraulic Clutch.—Frank de Coligny, Chicago, Ill., assignor to Coligny Hydraulic Tranmission Co., a corporation of Michigan, Filed April 8, 1909.

April 8, 1909.

April 8, 1909.

933,293. Vehicle Axle.—Charles T. Cullison,
Worthington, Ind. Filed January 18, 1909.

933,320. Roller Bearing.—Onesime E. Michaud,

St. Louis, Mo. Filed December 5, 1908.
933,367. Governor or Speed Regulator.—Alberd
de Dion and Georges Bouton, Puteaux, France.

Filed February 9, 1909.
933,420. Lock Nut Device.—Julius S. Conradi.
Belvedere, Edward Tilston, Manchester, and Peter
W. Masson, Belvedere, England. Filed January

27. 1909.
933,467. Speed Indicator.—Carl Knopf, New York, N. Y., assignor to Hicks Speed Indicator.
Co., Brooklyn, N. Y., a corporation. Filed May 24, 1907. Serial No. 375,535. Renewed May 15

933.494. Friction Clutch.—Milton S. Slauda and Thomas J. Kelly, Everett, Wash. Filed Sep

tember 1, 1908. 933,496. Wind Shield.—James H. Sprage. Norwalk, Ohio. Filed January 28, 1909.

933,607. Acetylene Gas Generator.—William A. Woods, Watsonville, Cal., assignor to Harry D. Freiermuth, Watsonville, Cal. Filed March 19, 1908.

933,614. Headlight.—Charles L. Betts, New York, N. Y., assignor to R. E. Dietz Co., New York, N. Y. Filed April 23, 1908.

933,684. Hydrocarbon Burner.—George E. Whitney, Boston, Mass., assignor, by mesne assignments, to Stanley Motor Carriage Co., a corporation of Massachusetts. Filed August 9, 1960. 933,686. Block for Vehicle Springs.—Thoms. Wright, Jersey City, N. J. Filed April 6, 1909. 933,694. Means for Igniting and Controlling Vehicle Lamps.—Alfred A. Clark, Baltimore, Md. Filed April 24, 1908.

933,704. Lifting Jack.—Frank L. Gormley.
Boston, Mass. Filed February 15, 1909.
933,705. Lifting Jack.—Frank L. Gormley.
Boston, Mass. Filed February 15, 1909.

933.709. Mixing Attachment for Internal Combustion Engines.—John Illy, Jamestown, N. Y. Original application filed May 10, 1907.
033.715. Pneumatic Tire for Automobiles and

Other Vehicles.—Charles A. Lewis, Denver, Calassignor of one-half to William A. Diboll, Denver, Col. Filed September 28, 1908.

# The Horseless Age

First Automobile Journal in the English Language

**VOLUME XXIV** 

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NUMBER 19

# The South's First National Show.

Few there are who realize the full meaning of the National Automobile Show held in Atlanta, November 6 to 13. Few appreciate it from the South's standpoint. The great majority look upon it as a complete exhibit of automobile lines and accessories. Such it is, undoubtedly. Automobile authorities have so classed it, placing it in the same category with the three other annual national shows that have be-

come fixtures in the calendar of the North and East.

But the more astute and far seeing among the authorities see in the show another significance-a greater significance; that is, the essential element of the Southern appreciation of the big exposition. They see in it the manifestation of awakening of the South as a rich and practically virgin automobile market. They realize its deeper meaning.

RESULT OF LOCAL FIGHT.

From a combination of circumstances

grew the Atlanta Show. It had its beginning in a protest against further continuance of the annual State fairs that for many years had been held in Atlanta. A contingent of Atlanta citizens during the last fair held in the fall of 1908 put their objections in written form and signed them, and organized to uphold them. The result of a rather complicated local fight was that the annual State fairs were wiped off the slate.

A demand existed for something to take their place in bringing visitors to Atlanta. The capital city of Georgia has prospered by keeping open house during many years, and there was no logic in a sudden discontinuance of its liberal policy.

An automobile show was suggested, and the suggestion received immediate support. Euthusiasm grew with each reversion to the subject, and the Atlanta Automobile Trades Association was organized among the automobile business directors of the city to stand sponsor for the show and work out its details.

ORIGINAL PLANS MODEST.

Small beginnings are sometimes responsible for bigger results than are anticipated. The original project for the show was modest in its pretensions. The plan was to exhibit as many cars of 1909 as could

THE AUDITORIUM-ARMORY WHERE THE SHOW IS HELD.

be gotten together by the local dealers, wherever they could be presented, and as soon as possible. The use of the city's magnificent new Auditorium-Armory, then (in April) just completed, was desired, but the desire did not meet with a great deal of spontaneous accord by the Auditorium-Armory management.

The minor importance of such a show forced itself upon the realization of the moving spirits in the project, and they began to lose heart. Just then a voice that had been persistently insisting on "a national show or none at all" began to be heard more and more loudly. The slogan became a chorus, timid enough at first, but growing more vigorous each day.

"We can't get a national show," was the opinion generally expressed. "Only two are held each year, and the big cities of the East and North get those. Atlanta would not be considered. Manufacturers would

not show their 1910 models here before they show them up East. And we don't want to wait till everybody has looked them over elsewhere before we bring the new cars here."

"NATIONAL SHOW OR NONE."

But the "national show or none" slogan won out, and with many misgivings a committee of Atlanta men went to New York

to confer with show authorities and leading manufacturers. The manifold details of their work during tedious days and weeks of all sorts of discouragement are hardly worth the telling now. Their success shines upon it all. Suffice it to say that they were tenacious, and that they won. They enlisted the friendship of influential automobile men who knew the city and its spirit. They argued away all objections. For this bigger enterprise the Auditorium-Armory had been placed freely at their disposal, and they

presented its advantages convincingly as the newest, largest and most complete edifice in the South.

And finally they swept away the last barrier, and won. The word "success" that they put upon the wires thrilled the whole South. The seemingly impossible had been accomplished, and a national automobile show had been secured for Atlanta; the first ever held south of Chicago, and the first of the year for exhibition of 1910 models.

#### FUTURE MANAGERS ON THE SCENE.

On April 28, S. A. Miles and Alfred Reeves arrived in Atlanta to look over the field for themselves. They were to combine their experience in managing the show. As general manager of the National Association of Automobile Manufacturers and general manager of the Motor Car Manufacturers' Association, their visit to the city, and their inspection of the conditions af-

forded the first real official recognition to the project. They signed the contract with the Atlanta committee on April 29 for a national show to be held in Atlanta from November 27 to December 4, inclusive. Later these dates were changed to November 6 to 13, inclusive. From the moment of the signing of the contract till the brilliant opening of the show on November 3, there was no cessation in the busy preparation for the big exhibition.

The thoroughness of complete experience characterized the working out of all the many detailed plans for the show. No detail was overlooked. Expert minds made the last square inch of floor space available in the building, devoting finally to the show's purposes more than 60,000 square feet of floor surface; little enough, in comparison with some other figures, but admirably distributed, though every foot of it was taken and there was still demand for more.

Atlanta's newspapers, notably the Journal and the Constitution (pioneer workers in the movement, and consistently ardent supporters of it), cordially and absolutely pledged themselves to the success of the show. In complete harmony the Atlanta press worked and boosted. The time was ripe. The moment was psychological. The infection of acclaim spread rapidly through Georgia, and soon swept the South and found its reflection in the North. Immediately there was fruition in Atlanta. Associating automobiles with the incipient campaign for good roads, one newspaper secured the partnership of a New York daily, and together they launched a movement for a national highway to connect New York and Atlanta, and to be dedicated to the purposes of travel and the slogan of good roads by a time table tour from the former to the latter city. Another Atlanta newspaper followed suit with a manifold project for endurance runs from Georgia points. The automobile race bud bloomed, and the Atlanta Speedway was begun. The first of these three came to a successful conclusion three days before the show started. The second rivaled that success just after the commencement of the show, and the races brought their culmination to the whole, while the show was in full swing.

On the afternoon of Saturday, November 6, the doors of the show were opened. Robert F. Maddox, mayor of Atlanta, welcomed the exhibition's attending caravans of visitors, and gave expression to the city's best wishes for success of the show. Asa G. Candler, banker and capitalist, head of the Atlanta show committee, declared the show officially opened and pressed the button that threw the brilliant flash of life into the big exposition.

Most of the accessory exhibitors were assigned to space on the second floor of the armory section, or on the third level of the building's construction, the mezzanine floor intervening between them and the main floor of the armory into which the entrance opened. Access to this exhibit was to be had by a single flight of stairs. There was some complaint on the first evening of the show that this floor was not sufficiently lighted, and a petition signed by the exhibitors presented the matter to the show

authorities. A varied exposition of articles pertaining to automobiles was offered here.

#### Gasoline Cars.

PREMIER MOTOR CAR COMPANY, Indianapolis, Ind.-Two cars and a classes are shown here, and many noticeable features are seen. The make and break spark is used, and the spark mechanism is provided with a cushioning device which permits considerable wear without need of adjustment or delicacy of adjustment when made. The insulated electrode is well in toward the combustion space, so the gas travels past it and keeps it clean and cool as well as insuring that even at very low throttle the new gas will be in reach of the spark and sure to ignite. The cylinders are enameled with a high heat enamel They are capped by a ribbed sheet stell cap, with ground joints, which is flexible enough to prevent damage, even if the water is allowed to freeze. The incoming gases pass into a water jacketed chamber The fan has an eccentric adjustment, as has also the steering gear, so the lost mo-tion may be taken up. The motor and transmission rest on pressed sub-frame members, which join the main frame at the front to make a hollow box structure of great stiffness. This sub-frame continues back to a cross member and stiffens the main frame at the point where it is narrowed for roomy turning. A multiple disc clutch is used dry, and a telescopic shaft is used between the clutch and transmission, so either can be taken out without much trouble.



GENERAL VIEW OF A SECTION OF THE MAIN FLOOR.



VIEW OF ONE END OF THE MAIN FLOOR.

PIERCE ARROW MOTOR CAR COMPANY.

Buffalo, N. Y.—Pierce cars are shown in nothing but sixes. The 36 horse power car has had its motor bore increased from 318 inches to 4 inches, and the wheels are 36 inches instead of 34 inches. The tires have likewise been increased a half inch, being now 4 and 41/2 inches. The wheel base has been brought up to 1241/2 inches instead of 110 inches, and in other ways the car has been made to correspond to the increased power and length. A single vibrator with a six unit coil is used in the ignition system, and magneto and battery are both supplied. A gasoline gauge is supplied on the dash. Spencer power air pumps are also part of the equipment, and lessen the tire pumping nuisance. The 48 horse power has larger wheels and tires than last year, using 37 inch by 5 inch rears and 36 inch by 41/2 inch fronts, instead of 36 inch rears and 4 inch fronts. These larger wheels have been fitted with Timken roller bearings all around, instead of the ball bearings heretofore used. The base of the 48 horse power car has also been lengthened from 130 inches to 1341/2 inches, largely by bringing the front axle nearly to the front of the radiator. Grease cups are now fitted to the spring bolts instead of oil cups. The outlines of the top, and particularly the stationary part of the side curtains, are noticeable.

## POPE MANUFACTURING COMPANY,

Hartford, Conn.—At this exhibit are shown four cars, viz., seven and five pasenger touring cars, a pony tonneau and a four passenger roadster. Among the improvements made may be mentioned the adoption of distance rods for the rear axle instead of depending on the front end of the spring

to perform this service. The semi-elliptic springs now have shackles at both ends, and are free to extend under action in both directions. They are mounted to swivel around the axle, and are provided with bronze bushings made dust tight and oil retaining by felt washers. Last year the torsion was taken not only by the springs but by the single torsion rod provided, but this year a double or V rod is used with vertical spring coils at its ball end to take the shock and resist the torsion of the axle. The spring irons extend well to the rear, and permit the use of springs 56 inches long, with very easy riding effects. The bodies are deeper than last year, and are cut out under the seats to admit the higher fenders, made necessary by the use of 36 inch instead of 34 inch wheels.

## LOCOMOBILE COMPANY OF AMERICA,

Bridgeport, Conn.-Few changes are to be found in this well known design of car, as the makers claim they cannot better a vehicle which has proven satisfactory in all its details. The larger car is now fitted with slightly lower body to better the riding qualities, and give it a more rakish appearance. This lessens the wind resistance and also makes the body more nearly resemble that of the smaller car. The larger motor is 5x6 inch, while the smaller is 41/2 inch square. One of the special features is the crank case base of bronze which, although a little heavier, is tougher and more rigid than the usual aluminum base. In the carburetor the increased air supply is through a conical coil spring, the coils of which open as the air suction increases. Both a foot throttle and a hand throttle are provided. There is also a governor which controls the throttle at any desired point. One of the most noticeable features—since it is found on but few machines—is the make and break spark ignition. A simple magneto supplies the make and break plugs with current.

# THE PACKARD MOTOR CAR COMPANY,

Detroit, Mich., are showing a five passenger touring car, a limousine and a seven passenger touring car. The five passenger car and limousine are on the 18 horse power (French rating) chassis, while the seven passenger is shown on the 30 horse power (French rating) chassis. The principal change over the 1909 car is the use of a multiple disc dry plate clutch instead of the expanding one formerly used. The cylinders are cast in pairs, with the valves on opposite sides and operated by two cam shafts. The clutch, as above mentioned, is a dry plate. The crank case is in three horizontal sections. The lubrication is through a positive feed oiler driver by a worm on the exhaust cam shaft and splash from the crank case, where a constant level of oil is maintained. Ignition is jump spark, the current being supplied by an Eisemann low tension magneto and storage battery for starting the motor from the seat. The transmission gives three speeds forward, and is located on the rear axle. The front axle is tubular and the rear axle full floating. The brakes are internal expanding and external contracting, operating on the rear wheel brake drums. The wheel base on the "18" is 112 inches, and the motor has a 416 inch bore and 51/8 inch stroke, while the wheels carry 34x4 inch tires. The wheel base on the "30" is 1231/2 inches. The motor has a 5 inch bore and 51/2 inch stroke, the wheels carrying 36x4 inch front and 36x41/2 inch rear tires.



PREMIER MANUFACTURING COMPANY'S STAND.

THE WINTON MOTOR CARRIAGE COMPANY, Cleveland, Ohio, have on exhibition one five passenger touring car, one four passenger toy touring car and one stripped chassis, all on the 48 horse power, six cylinder, standard chassis. The cylinders are of 4½ inch bore and 5 inch stroke. These cars have the only self starting motors shown in the building. They have a multiple disc clutch and selective type transmission, with four forward speeds, and are the only \$3,000 cars shown with four speeds. The wheel base is 130 inches. A complete detailed description of these cars is to be found elsewhere in the paper.

MATHESON MOTOR CAR COMPANY,

Wilkes-Barre, Pa.-The well known Mathesons are made in seven styles, the torpedo and gunboat designs of body being new with them. Owing to limited space but two styles are shown. The Matheson Six has six cylinders, with valves in the heads and of a bore of 41/2 inches by a stroke of 5 inches. A double ignition system is used. The gasoline tank is pressure acting, and a pump is fitted on some models at the front of the driver's seat where it can be easily reached. The transmission is carried at the rear axle, forming a two unit construction, with long propellor shaft and consequent slight angle of the joints. The clutch is a multiple disc type, and has fiftyone discs. The motor has a wide range, and with a speed of 60 to 65 miles per hour can also run down to 4 miles per hour on the high gear. These cars are guaranteed to do at least 12 miles per gallon of fuel. Tire carriers, a trunk rack and similar fittings are part of the regular equipment. The rear springs are three-quarter elliptic and add to easy riding, while the low deep bodies of the torpedo and gunboat styles are largely exempt from wind resistance and ride comfortably at speed.

#### MITCHELL MOTOR CAR COMPANY,

Racine, Wis.—Three models of the Mitchell are shown. The roadster, with a 30-35 horse power motor and 100 inch base, had last year but 20 horse power and 92 inch wheel base. The five passenger touring car uses much the same motor, but the wheel base is 115 inches instead of 106 inches. Both of these use three-quarter elliptic

springs, and the touring car has a floating rear axle. On it the wheels are now of 34 inches diameter instead of 32 inches as formerly. Both of these are of the four cylinder type. The Model S is a six cylinder car, of 50 horse power and with cylinders of 41/4 inches by 5 inches. It is built either with seven passenger body or close coupled body for five. As the power increased from 40 of last year, so the wheel base increased from 124 inches to 130 inches, and the wheels from 34 inches to 36 inches. The sub-frame formerly used for the transmission has been left off and the appearance of the chassis has been much simplified. Now a torsion tube around the propellor shaft is used, and at the front end of this is the transmission, which is pivoted or yoked to a cross member of the frame. This arrangement avoids universal joints between the transmission and the rear axle, and simplifies the construction very considerably.

### MOON MOTOR CAR COMPANY,

St. Louis, Mo .- The Model 30 is a new car, selling at \$1,500, and fitted with a four cylinder motor of 41/4 inch bore by 5 inch stroke. The cylinders are T shape and have valves of 21/4 inches diameter. The transmission is at the rear, and gives three speeds forward and reverse, on the selective principle. The wheel base is 110 inches, and the wheels are 34 inches with 4 inch tires on the touring car and 31/2 inch tires on the roadster. Magneto and batteries are furnished, using a single set of plugs. Brakes are expanding and contracting in drums 12 inches by 2 inches face on the rear hubs. The control is identical with that of the Model 45, which has been marketed for the last six years. This is also shown in improved form for the coming year. Its wheel base has been lengthened from 112 inches to 120 inches, and 36 inch wheels are used with 41/2 inch rear tires and 4 inch front. The horse power of the motor has been increased to 45 instead of 30-35. as last year, by increasing the bore and stroke to 41/4x5 inches. The valves are in the head, with overhead shaft. Magneto, four speeds ahead and a special type of rear axle are some of the features. In the 30, the flywheel has fan spokes, which does away with the necessity for fan bearings. The clutch is a special patentel device used two seasons.

#### ST. LOUIS CAR COMPANY,

St. Louis, Mo.-The Standard Six is a new car with a number of good features The valves are in removable cages in the heads of the motor. The cylinders are cast in pairs and are 41/2 inches by 5 inches size. The valve action parts are all hardened Large hand holes are provided in the case for easy access to the connecting rod ends. Lubrication is by splash, with pump to maintain the level and dash sight to be sure of the feed. A noticeable feature is the three point suspension of the motor, which has two points fastened at the front, and the rear swivel in a large bearing so as to be free from any twisting motion of the frame. Magneto and battery are furnished. The clutch is of the inverted cone variety, with leather face and cork inserts. The transmission uses annular bearings, and the wheels employ roller bearings throughout The frame is raised at the rear, and carried there on platform springs, all the holts of which have grease cups. At the front the frame is narrowed to increase the wheel turning space. The wheel base is 124 inches and the wheels are 36 inches, with quick detachable tires of 4 inch section. The brakes are equalized, and the steering gear and segment are adjustable for wear.

## THE MARION MOTOR CAR COMPANY,

Indianapolis, Ind., show one Gentleman's speed car and one five passenger touring car. The motor is four cylinder, east in pairs, with valves all on one side and operated by a single cam shaft. A multiple disc clutch is used, together with a three speed, selective type sliding gear transmission. The discs in the clutch run in an oil bath. The rear axle is full floating type, while the front is an I section drop forging. Semi-elliptic springs are used in front and full scroll elliptic at the rear. Cooling is effected by a cellular radiator, a centralugal pump and a ball bearing fan. Ignition is by Splitdorf magneto and batteries through a single set of spark plugs. The wheel base is 112 inches and 34x4 inch tires are used on both cars.

#### THE MURA MOTOR COMPANY,

of Newark, N. Y., show a Mora Tonrer, he passenger; a Mora roadster, four passenger; a Racytype, with double rumble seat, and a Model 20 runabout. The motors in these cars have 41/2 inch bore, 51/8 inch stroke, cylinders cast in pairs, with the exhaust and intake valves on opposite sides, operated by separate cam shafts. All the motors are four cylinder. The motor, clutch and transmission are all protected by a cast aluminum pan. The clutch is of the inverted cone type, and leather faced. The transmission is three speeds forward and reverse, selective type sliding gear. The carburetor is provided with independent adjustments for slow and high speeds, and an

adjustment for regulating the height of gasoline in the float chamber, which latter is made of tempered glass, so one can readily see in case of trouble whether the level of gasoline in the float chamber is right or there is a stoppage in the supply line. The ignition is by jump spark, with magneto and batteries working through a single set of spark plugs. Each system is independent of the other. Lubrication is by a self contained oiler in the lower half of the crank case, the oil being pumped from the reservoir to the bearings and splash basins by a gear driven pump, maintaining a constant level of oil. Cooling is effected by a radiator of the vertical tube design, a centrifugal pump and a gear driven fan. Brakes are internal and external, operated in the usual manner. Wheel base, 112 inches, with 34x4 inch tires

#### CADILLAC MOTOR CAR COMPANY.

The demand for more power has resulted in the four cylinder Cadillac being made with a bore of 41/2 inches, instead of 4 inches as heretofore. The wheel base has been lengthened from 106 inches to 110 inches, and the wheel sizes from 32 by 312 inches to 34 by 4 inches. To accommodate these larger wheels the frame is raised over the axle, but drops down to the rear thereof instead of continuing back in the raised level as heretofore. Brake drums have been enlarged and the details of the brakes have been somewhat changed. The front axle is now an I beam. Magneto and also the Delco system, consisting of vibrator and relay, are used. The brake and clutch pedals are now made adjustable to permit fitting to the user's needs. Gas lamps are now a part of the regular equipment as well as oil lamps. Three cars and a chassis are exhibited, the chassis being fitted with glass sides to the engine case, and a glass top to the transmission and with electric lights therein, so the working of the parts may well be seen.

## THE FORD MOTOR COMPANY,

Detroit, Mich., are showing one roadster, one town car, one five passenger touring car, one tourabout and one coupé, all on their standard chassis. These different style bodies are interchangeable with each other, making it possible for a purchaser to provide a car for various purposes by buying the extra bodies desired. The motor is a four cylinder, cast en bloc, with 334 inch bore and 4 inch stroke. The power plant and transmission are a unit with three point suspension. The valves are all on one side and operated by a single cam shaft. The ignition is by a low tension magneto generator of Ford design. This magneto has no commutator or brushes, no gearing, no contact points, no moving contacts and no moving wires. The rotating member is a part of the flywheel. The stator carrying the coils in which the current is generated is a stationary spider permanently attached to the motor, and the whole thing carried in the flywheel casing. No battery is used in connection with the magneto.

The transmission is planetary, with full control by pedals. The clutch for high speed is a multiple steel disc clutch operating in oil. Cooling is by thermo-siphon circulation and fan. An entirely new design of float feed automatic carburetor, with dash adjustment, is used. There are two sets of brakes, a service band brake on the transmission operated by pedal, and expanding brakes in the rear wheel hub drums controlled by a side lever. The wheel base is 101 inches, with 30x3 inch front and 30x3½ inch rear tires.

#### REO MOTOR CAR COMPANY.

Lansing, Mich.—Reo cars have a worthy addition in a four cylinder chassis fitted either as a roadster or touring car at \$1.250. The previous models are continued, but their precedents are departed from in several important particulars. The new motor has 30 horse power, 4 inch by 41/2 inch cylinders, cast in pairs; inlet valves cast in the heads, exhaust valves on the right side, by which arrangement large valves are secured. The water piping directs the coolest water to the exhaust valves from a honeycomb radiator. The transmission is selective, the clutch multiple disc with positive release, and the shaft joints are encased in oil. Three speeds forward, large fuel capacity, double brakes, battery and magneto and similar up to date features mark the car. The wheels are 34 inches with 31/2 inch tires. The wheel base is 108 inches and the speed up to 50 m. p. h. The front wheels are ball bearing, the rears roller bearing, with balls at the gears.

# YORK MOTOR CAR COMPANY,

York, Pa.—These cars are shown with very little change from preceding years. The use of full floating axles is, perhaps, the most radical difference. The motor stroke has been increased from 45% to 43% inches, the bore remaining 4½ inches. The comfort of the driver has been helped by mak-

ing the steering wheel 17 inches in diameter instead of 15 inches as in the past. The brakes are now double on the rear hubs instead of one on the drive shaft. The fenders have been changed in design. On the Model 40 the cylinders are of 5 inch bore by 51/2 inch stroke, while on the Model 50 the bore is 51/4 inches by 6 inch stroke. Magnetos and batteries are used, and there are four speeds forward on the larger cars. Wheel bases run 108, 112 and 124 inches. The clutches are conical, with cork inserts. The wheels are 34x31/2 inches, 36x41/2 inches and 36x5 inches. The frames are raised at the rear to get over the axles and narrowed at the front. One of the special features of these cars is the casting of the cylinders separately, but with abutting sides of water jackets open. These are afterward bolted together and make practically a block casting, but with the advantage that the block can be separated at any time for cleaning or inserting a new cylinder, if this should become necessary. Offset cranks are used and double cam shafts, one on each side of the motor.

#### AUSTIN AUTOMOBILE COMPANY,

Grand Rapids, Mich.-The Austin cars do not show much change. Believers in color effects, they have stuck to an ivory white, trimmed with tan, for six years, and show a car of this finish; also one "all golden brown" which is very rich in appearance. In their Model 45 they have increased the motor to 41/8 by 51/4 inches, with considerable gain in power The wiring of the motors has been bettered also. The Model 50 is a new car, much like the 60-90, and like all the others having six cylinders. It has a motor 41/2 inches by 6 inches, claimed to be very economical and accessible. The cylinders in this car are cast separately and the crank shaft has seven main bearings. The clutch is multiple disc, the transmission has four forward speeds and annular bearings, and the rear axle



POPE STAND, SHOWING MURAL DECORATIONS.

is of the floating type, while the front is of I section. The carburetor is a special with usual automatic adjustment and special adjustment from the seat for slow speeds and starting. The wheel base is 134 inches and the tires 36 by 4½ inches, while on the Model 60 the tires are 37 by 5 inches. Two complete and separate ignition systems are furnished.

#### THE PEERLESS MOTOR CAR,

Cleveland, Ohio, show three machines, a close coupled, five passenger, touring car, a seven passenger touring car, and a demi limousine. This latter is somewhat of a novelty. There have been no radical changes in this make of car for the past three years, but this year there has been quite a crop of refinements. Among these may be mentioned the use of spiral gears in place of bevel gears for the fan drive; an oil reservoir cast integral with the crank case, and ready means for draining out and refilling the crank case from the oil reservoir; a spring connection between the pedal and the operating collar of the clutch greatly facilitates the easy engagement of the clutch in the hands of a novice. An eye affixed to the gear shift lever, and a corresponding one on the "gate" permits the gears to be locked in the neutral position by means of any ordinary padlock. Another minor but at the same time substantial improvement is an arrangement by means of which the foot brakes may at any time be taken up by turning a wing nut which may be got at by taking up one of the foot boards.

# THE F. B. STEARNS COMPANY,

Cleveland, Ohio, are showing one seven passenger "30-60," one "15-30" landaulet, one "15-30" toy tonneau and one "15-30" polished and spotted chassis. The seven passenger "30-60" is four cylinder, with the 5\%x5\% inch cylinders cast in pairs, and valves all on one side. The clutch is a multiple disc, and is used in connection with a four forward speed selective type transmission.

The drive from the transmission is through chains to a sprocket on each rear hub, or the car can be had with shaft drive. The ignition on the "30-60" is by two separate jump spark systems, each with its separate set of plugs. The current source for one system is a Bosch high tension magneto, and for the other batteries supplying a Connecticut coil. The wheel base of the chain driven car is 121 inches, that of the shaft driven car 124 inches. The "15-30" has its cylinders cast en bloc, with all valves on one side. A multiple disc clutch and a three forward speed transmission of the selective type are some of its features, and the car is very similar to the "30-60," except that the latter always comes with shaft drive. No changes of consequence have been made in the general make-up of these cars. The rear axle, however, is out of the ordinary, since it is a solid drop forging bored out to receive the differential and floating axle. The "15-30" has a Bosch dual system of ignition. All models are regularly equipped with Continental demountable rims.

THE APPERSON BROTHERS AUTOMOBILE COM-PANY.

Kokomo, Ind., are showing one toy tonneau Jack Rabbit, one gentleman's speed car Jack Rabbit, one seven passenger, 40 horse power touring car and one five passenger, 30 horse power touring car. The motors are all similar, except as to size, having four separate cast cylinders, with valves on opposite sides. The toy tonneau has a 40 horse power motor, with 434 inch bore and 5 inch stroke. The speed car has 534 inch bore and 5 inch stroke, while the 30 horse power has 43% inch bore and 5 inch stroke. All the cars are equipped with the well known Apperson contracting band clutch. The cooling is by a vane pump and fan. The double system of ignition with two sets of spark plugs, together with magneto and batteries, is used. The transmission is a three speed forward selective. The speed car and toy tonneau use chain drive, and the other cars the shaft. There have been no changes of any importance made this year, and those changes that have been made relate to minor details. The shaft drive cars are equipped with semi-floating rear axles. The wheel bases of the several cars are: Toy tonneau, 116 inches; seven passenger, 122 inches; five passenger, 112 inches, and speed car, 116 inches.

THE NATIONAL MOTOR VEHICLE COMPANY Indianapolis, Ind.—Two machines are on exhibition at this stand, a four cylinder, five passenger, and a six cylinder, seven passenger. Both are equipped with ton-neau bodies. No radical changes are made ir. this year's models. The four cylinder "40" has had its wheel base increased to 125 inches, and the power slightly increased The main characteristics of the four and the six are the same, the cylinders cast in pairs, with valves on both sides. The constant level force feed system of lubrication is used. Two complete systems of ignition are provided-Bosch magneto and a single coil and distributor. The clutch is of the self contained cone variety, with springs under the leather to facilitate easy engagement. The transmission is of the three speed selective gate change type. The cylinder dimensions of the "40" are 5x5 11-16 inches. They have two sizes of sixes, a 50 horse power, with cylinders 43/x414 inches and a "60" which is 5x5 inches.

THE ELMORE MANUFACTURING COMPANY, f Clyde, Ohio, are showing one seven pas

of Clyde, Ohio, are showing one seven passenger, 50 horse power touring ear, a five passenger, 36 horse power touring car, a demi tonneau car and a 36 horse power stripped chassis. The five passenger and demi tonneau are both on the standard # horse power chassis, and have a four cylinder, two cycle, thermo-siphon cooled motor. with the cylinders cast separate. The well known Atwater Kent ignition is used on all models. The clutch used on the different models is the Elmore expanding ring. and is bronze to cast iron. A selective type transmission is used on all models, as well as a semi-floating type of rear axle. The lubrication on these motors is out of the ordinary, inasmuch as the oil is fed into the intake pipe and is supplied through it to the inner chambers.

## THE BARTHOLOMEW COMPANY,

Peoria, Ill., showing the Glide, have one special 45 horse power, seven passenger, touring car and one four passenger, 45 horse power roadster. These two models use the one standard chassis. The motor is a four cylinder, with the cylinders cast separate and valves all on one side. The cylinders are of 434 inch bore with 5 inch stroke. The clutch is a multiple disc running in oil, with a three speed selective transmission located on the rear axle. The ignition is by a double jump spark system, with two sets of spark plugs, working with a high tension Eisemann magneto and a storage battery, respectively. The



THE REO STAND.

steering gear is quite different from the usual worm and gear type, consisting of a large bevel gear with double links connecting with the steering arm. The torque and driving strains of the rear axle are carried on a central cross member of the main frame through a tube and radius rods which run back to the brake drum flanges. The brakes are exceptionally large, being 16 inches in diameter, with 3 inch face. Besides the complete cars there are also on exhibition several groups of parts, such as the various parts of the steering gear, parts of the transmission and the complete rear axle, with the transmission and differential housing open to inspection.

#### THE DAYTON MOTOR CAR COMPANY,

of Dayton, Ohio, show five cars—a five passenger, 40 horse power touring car; a 50 horse power touring roadster, a 50 horse power, seven passenger touring car, and a limousine of the same horse power. The motor has undergone quite a few changes, which are rather interesting. In this year's models two rocker arms are used, one set to operate the exhaust valves and the other the inlets. These are actuated from separate cam shafts on opposite sides. Roller bearings are used on the rock shafts. The cylinders are cast in pairs as formerly The exhaust valve cages are held in position by a double voke which is retained by a castellated nut on a stud bolt. Two complete ignition systems are in use, a magneto system and the Dolce single spark system. Another special feature about the motor is the new Stoddard-Dayton carburetor, which is so arranged that as the auxiliary valve opens a second jet is gradually brought into action. Pressure feed for the gasoline has been adopted on this year's models. The bodies on these cars exhibit a number of interesting features. The runabout top is supported well forward and breaks just back of one of the rear stays. which brings the top when lowered well away from the rumble seat.

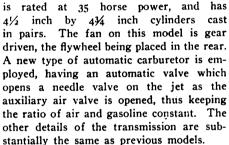
# THE NORDYKE & MARMON COMPANY,

Indianapolis, Ind.—Three Models 32 are shown by this concern, one a lead colored chassis, a runabout with elliptic gasoline tank back of the front seat, and a close coupled "suburban" car. The motor on this car has four cylinders, cast in pairs, with valves on opposite sides, the cylinder dimensions being 4½x5 inches. Bosch dual ignition is used. The clutch is of the cone type, faced with a special asbestos fabric with relieving spring. The lubrication is by a circulating system, with a hollow crank shaft, through which the oil is forced to the main bearings, as well as to the crank pins and wrist pins. The gear is of the three speed, selective type, and is located on the rear axle. A peculiarity of the construction is that the operating levers are housed in the hollow torsion rod. The rear axle construction is such that the differential and change gear can be removed through an opening in the axle casing, to the rear without removing the same from the frame. A very ingenious and simple take-up device is provided for both brakes, which are well equalized. Full elliptic springs are used in the rear.

#### THE STEVENS-DURYEA COMPANY,

Chicopee Falls, Mass., show a Model X, four cylinder touring car, and also a limousine on the same chassis; also a Model Y.

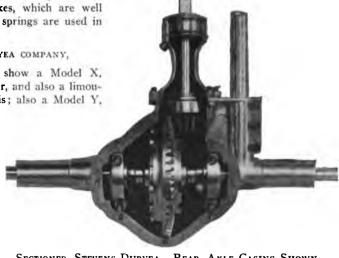
six cylinder, seven passenger touring car, and a Model X chassis. They have this year brought out a small six, known as the Model AA, which is shown with a touring car body. This has a wheel base of 128 inches, and 36x4<sup>1</sup>/<sub>2</sub> inch tires in front and rear. The motor



THE MAXWELL-BRISCOE MOTOR COMPANY. Tarrytown, N. Y., show their AA runabout, which, in the main, has not been changed from last year's model, it having a double opposed, 4x4 inch motor, with a wheel base of 82 inches and 28 inch wheels. transmission is of the planetary type, giving two speeds and reverse. The 1910 cars of this model will, however, be fitted with the combined battery and magneto ignition now used on all models of this make. A new car brought out this year is the Model Q. This has a four cylinder, 33/4x4 inch motor, with valves on opposite sides. The wheel base is 93 inches, and the wheels are 30x31/2 inches. A multiple disc clutch is used, and a three speed and reverse sliding gear transmission. The clutch and gear are interlocked so that the gear cannot be shifted unless the clutch is withdrawn, or the clutch engaged unless the gear is properly in mesh. The Model G is designed on similar lines, but with a 41/4 x 41/2 inch motor, a wheel base of 110 inches and 34x4 inch tires. The cooling of all models is by thermo-siphon circulation. On both these models the left hand pedal first releases the clutch, and then applied the brake.

# THE H. H. FRANKLIN MANUFACTURING COMPANY.

The main mechanical features of the 1910 models are the abolition of the fan at the front, and the use of a suction fan integral with the flywheel in the rear; the use of a horizontal partition and jackets which surround the cylinders so that the air is drawn downward through these, thus ensuring uniform cooling of every cylinder. The cooling fins have been made vertical to render



SECTIONED STEVENS-DURYEA. REAR AXLE CASING SHOWN.

this type of cooling more efficient. Two six cylinder Model H machines are shown, one with a close coupled body finished in golden brown, the other a regular seven passenger tonneau finished in maroon. These machines are rated at 42 horse power, and are fitted with multiple disc clutch and selective transmission, and otherwise follow the well known Franklin lines. The four cylinder, Model B, rated at 28 horse power, is also fitted with a selective transmission. This is shown in two touring car models. The G. rated at 18 horse power, is shown in a touring car and runabout model. This latter model is fitted with a progressive sliding gear. All models are provided with Bosch high tension magneto ignition, with governed spark, and with the regular Franklin carburetor; they are also provided with full elliptic springs, both front and rear.

#### THE CHALMERS-DETROIT MOTOR COMPANY,

Detroit, Mich., show both their "Thirty" and "Forty," with tonneau bodies. In addition to this, they have a "Thirty" chassis, with the cylinders and other working parts cut open so as to show the operation of the parts, the whole being driven slowly by an electric motor. There have been no changes on either of these models of anything like a radical nature. The horse power of the "Thirty" has been increased, the bore being now 4x41/2 inches; the wheel base has been increased to 115 inches, and the wheel diameter to 34 inches. The "Forty" remains the same as to mechanical details, with the exception that a magneto is now included in the regular equipment. However, the wheel base has been increased to 122 inches and the wheels to 36 inches.

#### THE OLDS MOTOR WORKS,

Lansing, Mich., have on exhibition a runabout, a six cylinder "Limited." The peculiarity of the so called "Limited" is the use of 42 inch wheels. They also show a six cylinder, seven passenger "Limited," and a close coupled four cylinder. In addition to this they show a six "Limited" polished chassis, and also their new four speed gate change transmission, which is used on all 1910 models. On this year's models they are using a carburetor of their own design, which is of the annular float chamber type, with auxiliary air valve. A special feature of this carburetor is the method of adjusting the needle valve, which allows of very fine adjustment. Bosch dual ignition is used on all models. A minor feature is the use of a petcock, with standpipe near the carburetor, which allows of drawing small quantities of gasoline for priming the motor, cleaning the hands or small parts, etc., and also for testing the condition of the pressure feed system.

#### THE PENNSYLVANIA AUTO-MOTOR COMPANY.

Bryn Mawr, Pa., are showing one seven passenger touring car, with 36 horse power, 434x51/4 inch four cylinder motor; one five passenger touring car, with 20 horse power, 41/4 x41/4 inch four cylinder motor, and one six cylinder chassis, with a 54 horse power, 434x51/4 inch motor. The cylinders of the several models are cast in pairs, with valves in the head operated through rocker arms from separate cam shafts on either side of the motor. The Bosch dual system of ignition is used on all models. The cooling is effected by a gear driven gear water pump, a belt driven fan and the radiator. Lubrication is assured by a pressure feed system. The clutches used are leather faced cone, with cork inserts and ball thrusts. The three forward speed selective type transmission is used on each different model. The front axles are I section drop forgings, while the rear are full floating. The brakes are internal expanding and external contracting, operated in the usual manner. The wheel base of the 29 horse power is 110 inches; weight, 2,300 pounds; the 36 horse power has a 114 inch whel base and weighs 3,000 pounds. The transmission on all cars is placed on the rear axle.

# THE HUDSON MOTOR CAR COMPANY.

Detroit, Mich., are showing two styles in their runabouts, but using the one chassis for both. One style is equipped with an oval gasoline tank attached back of the seat and the other with a single rumble seat at the rear. The motor is a 20 horse power one with the cylinders cast en bloc, and has 334 inch bore and 41/2 inch stroke. with the valves all on one side. The exhaust header and inlet manifold are separate castings and are free from sharp angles. In the chassis of this model, which is also being shown, can best be seen the arrangement of the leather faced cone clutch, with its slip springs underneath, and the three forward speed selective transmission. The lubrication might be termed a flooding system, as the oil level in the splash basins is kept constant by means of a plunger oil pump. Cooling is effected by means of a liberal sized centrifugal pump, fan and vertical tube radiator. Jump spark ignition with dry cells and coil is used, while provision is made for installing a

magneto. External and internal brakes act on rear wheel drums. The wheel base is 100 inches and the weight 1,700 pounds.

THE OVERLAND AUTOMOBILE COMPANY, Toledo, Ohio, show two types of body on their Model 38 chassis, one a runabout and the other a touring car. The motor is a four cylinder, cast singly, with valves on the same side, of 334 inch bore by 41/2 inch stroke. Ignition is by Remy magneto. The transmission is of the two speed and reverse planetary type, but the method of control is characteristic of the Overland, all three speeds being controlled by two pedals. The wheel base is 102 inches, and the tires are 32x31/2 inches. They also show their Model 40, the main characteristics of which are the same as those of the 38. However, the motor has been enlarged to 41/4x41/2 inches, and the wheel base lengthened to 112 inches, while the tires are 34x31/2 inches. They also show their Model 42 touring car, which is built on standard lines, with a three speed selective gear and a cone clutch with cork inserts. The motor on this car is 41/2x41/2 inches, the wheel base 112 inches and the tires are 34x4 inches.

THE GREAT WESTERN AUTOMOBILE COMPANY, Peru, Ind., are showing but one model, and that the Great Western "30," a five passenger car. They are also showing a cylinder with a part cut away to show the water jackets and the valve chambers; also a crank shaft showing its five main bearings, together with the clutch spring and thrust washer, and the lower portion of the crank case, with its oil pump for circulating the oil from the lower reservoir to the splash basin for maintaining a constant oil level. The cylinders on the Great Western motors are cast separately, with the exhaust in the head and the intake on the side. The exhaust valves, which are held in cages, are operated through rocker arms, the intake through push rods, and both are operated by the same cam shaft. A cone clutch and selective, three forward speed transmission are used, with a semi-floating type rear axle. The clutch has a composition covering, with a ball thrust releasing yoke. Ignition is by jump spark, magneto and dry cells, using a single set of spark plugs. The wheel base is 112 inches, with 34x3½ inch tires. Weight, 2,200 pounds.

#### CARTERCAR COMPANY,

Pontiac, Mich.—At the Cartercar booth five cars were shown. Two sizes of motor, the 25 horse power and the 30-35 horse power, are used, both four cylinder. With the smaller motors the natural circulation is used, but the larger motors are equipped with a centrifugal pump. The larger vehicles have a 110 inch wheel base, with 4 inch tires, while the others have a 100 inch wheel base with 3 inch tires, and all wheels are 32 inches. One of the vehicles shown is a taxicab. On a number of the cabs two cylinder motors are used. Very few changes have been made over last year. Magneto and gas lamps are included in the

equipment. The shifter bracket has been somewhat lightened and improved and the fibre or paper friction ring has been made sectional, so it can be removed and a new one substituted without taking down the drive shaft. The transmission is of the friction type, and the driven wheel is 20 inches in diameter, giving it a large leverage over the work to be done. The chain from the driven shaft is encased in an oil and dust tight case so that chain runs in oil, and it is, perhaps, the only car with chain as carefully encased as gears. The makers claim that a chain under such protection does not wear nor stretch.

#### COLE MOTOR CAR COMPANY.

Indianapolis, Ind.—These cars have cylinders cast separately, four of them making a 30 horse power motor. The valves, carburetors and exhaust are on the left side. The splash system of lubrication is used. Ignition is double, by magneto and battery. A Brown & Sharpe transmission, with selective rocker shifting lever, is attached to the engine case in such a manner as to fully enclose the flywheel. This makes a very strong arrangement, neat and clean, but the flywheel is of rather less diameter than usual. Another feature of interest is the mounting of the full elliptic springs on the rear axles by the use of rockers so the rear axle torsion is not taken by the springs. Distance or radius rods are provided, with springs on their front ends under compression, so that any twisting of the rear axle tends to shorten the springs, and they in turn tend to restore the axle to its normal position. To allow for the movement the slip joint in the propellor shaft has some 4 inches of length. The emergency brake is connected with the clutch so that application thereof pulls out the clutch. The rear axle is floating and the wheel base is 108 inches.

#### F A L MOTOR COMPANY,

Chicago, Ill.—The Falcar is claimed to be a new but standard construction wherein unusual features have been avoided. The horse power is 30, and the cylinders are cast in pairs, with 41/4 inch bore and 41/2 inch stroke. The valves are large, and at one side of the cylinder. Lubrication is by splash, with pump to maintain the level. Magneto and batteries are supplied for ignition. The clutch is conical, with a surface of asbestos composition. The transmission has ball bearings, while the running gear is ball and roller bearing. The steering gear is adjustable for wear. The wheel base is 110 inches, and the wheels are 34 inches in diameter, with 34 inch tires. The lighter rigs have 31/2 inch tires, but the heavier ones 4 inch, all quick detachable. The rear springs are three-quarters elliptic, and the speeds go up to 50 m. p. h. The tank capacity is 17 gallons. The brakes are equalizing, the service brake being lined with Thermoid, while the mergency brakes have metal to metal surfaces. The front axle is I beam. A button is provided for

starting on the switch. A roadster, two touring cars and a town car are made.

#### JEWEL CARRIAGE COMPANY,

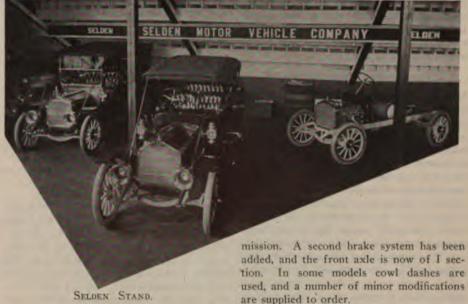
Cincinnati, Ohio,-This car is of 40 horse power, with four cylinders cast in pairs. The valve chambers and water jackets are integral with the cylinders. The bore is 41/4 inches; the stroke the same. The circulation is natural, with large tubular honeycomb shape radiator. A large, easily adjusted fan is provided. The splash system of oiling with pump circulation is used. A foot accelerator is provided in addition to the hand throttle. The clutch consists of five plates, of which two are bronze with cork inserts to easily take up the load. The springs are three-quarter platform in the rear. The front axle is I beam, and all wheel bearings are roller type. The wheel base is 115 inches, while the tires are 34x4 inches. The transmission is hung midway of the frame, with one universal joint between it and the engine and two on the propeller shaft to the rear. A special feature is a blind hinge to the hood, which makes it rain and wash water tight, and so protects the magneto and engine parts.

#### THE BRUSH RUNABOUT COMPANY,

Detroit, Mich., have on exhibition a racing car, with a reputed speed of 45 miles per hour, known as D-26; one regular runabout, D-24, and a double rumble seat, four passenger car, D-30. The racing car is the standard chassis, with a higher gear and an oval copper gasoline tank secured back of the seats. The seats are set further back to give greater rake to the steering gear. The improvements over the previous well known models are as follows: A 6 inch longer wheel base, more graceful and rakish lines, Mercedes type radiator, new selective control, universal coupling propeller shaft, improved commutator, multiple disc, low and reverse clutches, transmission control levers entirely housed and oil tight, and a more quiet muffler. The motor in these cars is a 10 horse power vertical single cylinder, with 4 inch bore and 5 inch stroke, placed under the hood with three point suspension. The transmission is of the internal gear type, with multiple disc clutches. The cooling is effected by thermo-siphon action, together with the radiator above mentioned. The frame is of selective wood. The spiral springs are located at the extreme corners of the car. The brakes are internal expanding in the rear sprocket hubs. The drive is through jack shaft and chains to rear wheel sprockets. The wheel base is 80 inches.

### THE COLUMBUS BUGGY COMPANY,

Columbus, Ohio, show their gasoline line, which includes their 7-A runabout, equipped with left hand control. The wheel base is 100 inches long, and the tires are 32x31/2 inches. The motor has 4x4 inch cylinders, cast in pairs, with all valves on the same side. Cooling is by thermo-siphon circulation. Ignition is by a dual magneto and battery system. Lubrication by a circulating splash system, with sight feed on dash.



SELDEN STAND.

A leather faced cone clutch is employed with a three speed selective, gate change gear. They also have their 6-B touring car on exhibition. The general features of this car are the same as the 7-A, except as regards dimensions and that a right hand control is used. The wheel base is 117 inches, and the tires are 34x31/2 inch front and 34x4 inch rear. The motor is 41/2 inches square. A rather interesting minor feature of both cars is a funnel carried on the radiator. When the filler cap is removed the funnel, which is carried inverted on the filler pipe, can be removed and placed in position thereon. The mouth of this is elliptic in form, thus allowing one to pour water from a bucket into the radiator with ease. When the funnel, which is a casting of polished brass, is replaced in its normal position on the radiator its use would never be suspected. Another feature of this make is the equipment of all models with electric lights and a 100 ampere hour storage battery for running them.

## STREATOR MOTOR CAR COMPANY,

Streator, Ill.-The Halladay Model 40 exhibits a few changes over last year. The wheel base has been lengthened 5 inches, and the wheels have been increased to 36 inches. To fit these changes the bodies have been made longer and more roomy, the frame has been raised at the rear end and the body sides cut into to make room for the fenders. By these changes a low hung, easy riding body is secured, and yet the road clearance has been maintained. Annular bearings have been fitted to the transmission, and the control levers are now of the rocking, selective type. The use of annular bearings all around is new, and the universal joints are fitted with grease cases which lubricate and exclude dust. The Model 30 is new, but is simply a reduction in size of the larger car. In the Model G a number of changes are found, such as larger radiator and water jacket capacity, larger and improved valve design and an additional speed to the trans-

# W. H. M'INTYRE COMPANY,

Auburn, Ind .- Four models of the McIntyre are shown. Of these three are built on the same chassis and differ in the bodies only, being for two, four and five passengers, respectively. These have 112 inch wheel bases, and the wheels are 36 inch, with 31/2 inch tires, but an option of 37x 4 inch tires is given at a cost of \$50 extra. The motors are T head type, with large valves, and a bore and stroke of 41/4 and 51/2 inch, respectively. The cylinders are cast in pairs and the motor is rated at 40 horse power. Double ignition is fitted, one set of plugs being fired by the battery, the other by the magneto. The clutch is an inverted cone, with leather face and cork inserts. The steering is adjustable for wear. The rear axle is of the full floating type and the front is an I beam. The lubrication is by pump to the crank case and splash lubrication therein. A small runabout at a moderate price is also shown. This has a two cylinder opposed motor in front and planetary transmission with shaft to the rear. It can also be furnished with chain drive if preferred. In this car the circulation is natural and the motor cylinders are 43/4×43/4 inches. The base is 90 inches and the tires are 30x3 inches.

# THE BLACK MANUFACTURING COMPANY,

Chicago, Ill., are showing three styles of the "Black Crow," one roadster, one toy tonneau and one surrey-all on the same chassis. The cylinders of the motor are cast separate, with the valves on opposite sides and operated by separate cam shafts. The bore is 33% inches, with 41/2 inch stroke. Lubrication is by self contained constant level splash system in connection with a gear driven pump. The clutch is of the multiple disc type, running in oil and working in connection with a three speed selective sliding gear. The radiator is of the honeycomb type, and the circulation is by thermo-siphon action. The rear axle is full floating type, while the front is tubular.

The brakes are internal expanding and external contracting, operated by the usual method of pedal and hand lever. The wheel base is 107 inches, with 32 inch tires. The weight is given as 1,840 pounds.

#### KNOX AUTOMOBILE COMPANY,

Springfield, Mass., are showing one Model R, five or seven passenger touring car, one Model R tonneauette and one polished power plant with one cylinder head removed and on exhibition, showing the valve arrangement. The only changes of note are the crank case and yoke, which carries the transmission. These were formerly integral, but the yoke is now separate and bolted to the case. Another change is in the water circulating pump, this having been changed from a gear pump to a centrifugal one. The transmission is of an entirely new design and is very compact. One feature of this transmission is that the shaft bearings are only 5 inches apart, thus making it very rigid. There is no telescoping hollow shaft employed, nor are there any nuts, bolts or cotter pins inside the transmission case. The clutch is of the three plate type, encased in the flywheel and fitted with cork inserts. The motor used in these models is a four cylinder, with cylinders cast separately, with both valves in the head and operated through rocker arms from a single cam shaft.

#### AUTOCAR COMPANY,

Ardmore, Pa., show one Type 22, five passenger touring car, one closed 11/2 ton delivery wagon, and one 11/2 ton open delivery wagon. The touring car is shown in deep Brewster green, which is their standard color. It has a four cylinder, water cooled motor with cylinders cast separate and the valves all on one side. One feature of this motor is the use of hand hole plates on the sides of the crank case. Many manufacturers do not seem to consider these necessary, while car owners complain because they are not there. The delivery wagons have double opposed motors of 43/4 inch bore and 41/2 inch stroke, with the valves on the upper side of the cylinder. The motor is placed crosswise of the frame in front and used in connection with a clutch and sliding gear transmission. All the cars are equipped with the well known Autocar floating ring clutch, consisting of a bronze ring with cork inserts.

### BUCKEYE MANUFACTURING COMPANY,

Anderson, Ind., are showing one Model 36, five passenger Lambert, in deep red finish and one Model 36 chassis. A belt running from the flywheel of the motor to an electric motor stayed to the floor keeps the motor and transmission in operation. Little or no change seems to have been made from former models. One feature, however, that strikes one on this car is the use of a Wilkinson mechanical motor starter, which is operated by a pedal resembling the brake pedal. When desiring start the motor one simply presses this

pedal forward and the motor is turned over. With this contrivance it is impossible to become injured by back kicking. The friction drive of the Lambert is too well known to require description. The motor is four cylinder, cast en bloc with 4½ bore and 4½ inch stroke. The valves are all on one side, and operated by a single cam shaft. The cooling is by a round tube radiator and fan. The wheel base is 110 inches. The Wilkinson starter comes as a regular equipment on the Model 36, but is an extra on all other models.

#### THE JACKSON AUTOMOBILE COMPANY,

Jackson, Mich., show a Model 50, seven passenger touring car, the extra seats being furnished for \$30; a Model 40, five passenger touring car, and a Model 30, five passenger touring car. Each of these several models is finished in black, and presents a very pretty appearance. All are four cylinder, with the same general construction. The motors have twin cylinders, with the valves inclined at 45 degrees in the cylinder heads and operated by an overhead cam shaft. A unit power plant is used, with self contained oiling system. The motor is water cooled, circulation being by the thermo-siphon system. The transmission housing is incorporated in the unit power plant. The multiple disc clutch runs in oil. There are three forward speeds, operated selectively. Ignition is by Splitdorf magneto and batteries through a single set of spark plugs. The "50" has a 434x434 inch motor, the "40" a 41/2 x 41/2 inch motor and the "30" a 4x4 inch motor. The respective wheel bases are 120 inches, 110 inches and 105 inches.

## PETREL MOTOR CAR COMPANY,

Milwaukee, Wis.-The Petrel cars are made in three styles, the touring car, a toy tonneau and a roadster, all built on the same chassis. The seats are low and the steering post is very flat, making the front of the vehicle quite long. The side lights, usually on the dash, are carried on the sides of the seats. The brake and gear shifting levers are quite short and not greatly in the way in mounting from that side of the vehicle. The wheel sizes have recently been increased from 32 inches to 34 inches, and 31/2 inch tires are used. Magneto and searchlights are included in the equipment. On the roadster a fuel tank holding 20 gallons is provided. The friction drive has adjustable springs to hold the discs in contact, but for emergency work a pedal can be used to increase the pressure. This preverts the operator carelessly setting the frictions together so tightly as to throw unnecessary wear on the bearings and require unnecessary power.

#### RENAULT FRERES SELLING BRANCH,

New York, show three models, including a 12-16 horse power chassis equipped with a touring roadster body. This has a wheel base of 116 inches, and the tires are 875x105

mm. front and 880x120 mm. rear. The cylinders are 31/4x41/4 inches. They also have a 14-20 horse power touring car on view. This latter has a wheel base of 120 inches, the tires being 875x120 mm. front and rear. The motor is 33/4x41/4 inches. This latter is equipped with a four speed gear. Besides this, they also show a 20-30 horse power limousine. This latter model has a wheel base of 128 inches and 920x120 mm. rear and 915x105 mm. front tires. The cylinders of this macnine are 4x53/4 inches. This model is also equipped with a four speed gear, and in addition with the Saurer pneumatic self starting device.

#### THE SULTAN MOTOR COMPANY.

Springfield, Mass., have on exhibition a light touring car and a town car. This chassis is especially designed for taxicab work to meet the requirements of the Scotland Yard authorities. The most striking feature is the completely removable power plant, the radiator, motor and transmission being mounted with the dash on a subframe, which may be disconnected from the machine and removed inside of thirty minutes. The motor is 3x43/8, cast in pairs, with all valves on the same side of the head. A Bosch magneto with fixed spark is used for ignition. Cooling is by thermosiphon circulation. The carburetor is arranged so that the mixture can be controlled from the dash, and high gasoline economy is claimed. The clutch is of the disc type, and the transmission of the gate change, selective type giving three speeds and reverse. The wheel base is 97 inches, and the tires are 32x31/2 inches.

#### MOLINE AUTOMOBILE COMPANY,

Moline, III.—The Moline cars have been changed very little for the coming year. The Model M touring car wheel base has been brought up to 110 inches from 107 inches. It may be used as a touring car, a roadster or even a business wagon by changing the body rears, thus meeting the needs of practical people fully. The power of the motor has been increased by making the bore 4 inches instead of 37% inches, the stroke remaining the same, 41/2 inches. For the coming season the magneto equipment is included in the regular equipment; gas lamps are likewise included. Natural circulation is used, and a very large radiator. A special feature is the mounting of the flywheel in between the arms of the frame of aluminum, which carries both the motor and gear case.

#### THOMAS B. JEFFERY & CO.,

Kenosha, Wis.—The Rambler exhibit includes three cars and a chassis. While few changes have been made, some are to be seen and are worthy of notice. The 45 horse power car uses an expanding clutch of special design instead of the cone clutch. The magneto has been set further forward to increase accessibility. The bodies are more commodious than heretofore. Spare wheels are fitted to all cars, as in the past

One of the special features is the fitting of the wheels to a square taper rear axle instead of to square straight stubs. This is a matter of durability particularly, for it permits adjustment, and the wheels may be kept free from looseness permanently. The, 34 horse power car is now fitted with magneto and battery ignition. It also has full elliptic springs instead of semi-elliptic. On this car the wheel base has been shortened from 112 inches to 100 inches, for greater handiness. A neat little fitting, which adds comfort and safety, is the placing of the horn bulb at the elbow with the support behind, so the horn may be blown by a slight movement of the elbow. The offset crank and the mounting of the transmission on the front end of the torsion tube are features worthy of notice.

#### STUDEBAKER AUTOMOBILE COMPANY.

South Bend, Ind.—At the booth bearing this well known name are several exhibits, the Studebaker limousine being new, as is the Flanders "20." This latter is particularly interesting, because of the price and the quantity which will be made before another year rolls around. It has four cylinders in block, with bore of 35% inches and stroke of 334 inches. The valves are all on one side, with a single cam shaft to operate them. A pressed steel cover closes a large opening in the water jacket on the head of the engine, rendering cleaning easy and freezing not dangerous. The valves are of 178 inches diameter and guided by removable bushings. The cams and valve lifters are ground to size, and a fibre block deadens noise. The clutch is of the inverted cone type, faced with leather. The noticeable feature of assembling is the unit idea. Thus the motor, with magneto, pump, carburetor, radiator, dash and steering gear, are all carried on a tubular sub-frame as a single unit. Four bolts permit the removal of this and the substitution of another. The transmission is on the rear axle, and ball and roller bearings are provided for the wheels. The body types are limited to two.

#### SELDEN MOTOR VEHICLE COMPANY,

Rochester, N. Y.—This car is shown in two models and a chassis, and is fitted with magneto on all models, instead of on part, as last year. The engines have been made more powerful by using larger cylinders. The transmission is of different manufacture, but with the same number of speeds. The timer is now on the end of the cam shaft, and the valves are on the left side of the engine instead of on the right. The belt for driving the fan has been brought to the right side instead of the left. The motor and transmission are carried on a sub-frame to avoid twisting strains. Four unit coils are used this year. The principal difference is the reversal of the engine with respect to the location of its main parts. The brakes are equalized, the spring bolts have grease cups, and the pedals are adjustable. Special attention is called to the torpedo body as of new design, and affording protection to the passengers from dirt and air resistance.

#### SPEEDWELL MOTOR CAR COMPANY,

Dayton, Ohio, show one Model 10-H roadster. with semi-racer torpedo body, with large oval gasoline tank back of the front seat and an artillery rear seat: one Model 10-C four passenger toy tonneau; one Model 10-F touring car, and a polished chassis. All these different bodies are fitted to the standard 50 horse power chassis, which has a four cylinder, water cooled motor, with the cylinders cast in pairs and all valves on one side. The cylinders have 5 inch bore and 5 inch stroke. A leather faced cone clutch is used in connection with a selective. three speed transmission. The rear axle is a one piece drawn steel tubing, split and shaped in the centre to admit the differential casting. The wheel base is 1211/2 inches and 36x4 inch tires are used.

#### HUPP MOTOR CAR COMPANY,

Detroit, Mich.-In this car are several changes of interest. The cone clutch has been replaced by a multiple disc, one having nine saw steel discs running in an oil bath in the gear case. The oiling system has been replaced by one which is positive in action, but is regulated by a connection with the throttle so that turning on more power insures that the engine gets more lubrication. It is well known that an engine running light is likely to smoke, and this arrangement not only prevents this, but effects economy of oil. The radiator capacity has been increased by a double row of tubes, and by an auxiliary tank of larger capacity. The drive ratio is now 4 to 1 instead of 31/2 to 1, an improvement for most American roads. The drive shaft has a ball bearing at the rear end to take the thrust and strain. The steps are further forward, with greater convenience in mounting, and are carried by two brackets instead of one. The front axle is I beam section instead of tubular. The fuel tank is now an oval cross section, with the longest diameter vertical.

## INTERSTATE AUTOMOBILE COMPANY,

Muncie, Ind.—The Interstate cars have been increased in size, and to meet the increased size by increased power the cylinders have been bored 41/2 inches instead of 41/4 inches. and have 5 inch stroke. The wheel base has been extended from 112 inches to 118 inches. This permits of a longer body, with more room, both front and back. clutch action has been improved, and the capacity increased by using sixty-three steel discs of tempered saw steel. Where formerly full elliptic springs were used now three-quarter elliptic are used on the Forty. The engine valves have been made larger. In these cars the transmission is rigidly carried at the front end of the torsion tube which surrounds the shaft, and the transmission frame is pivoted to the cross member of the main frame with only one universal joint between it and the engine. The main frame is reinforced where this cross member attaches, to make it able to carry the driving and reversing strains without sagging.

#### THE WHITE COMPANY,

Cleveland, Ohio.-While the White steamer is being sold in greater numbers than ever, the company are now in position to meet calls for a gasoline car, and particularly to meet that class of buyers who think that because the maker has but one kind which he wishes to sell, some other kind must be better. They offer this year a gasoline car. new to many, and embodying some interesting features. The cylinders, four in number, are cast in block, and are of 33/4 inch bore by 51/8 inch stroke. This is longer stroke in relation to bore than common. The makers have particularly aimed at simplicity and simple appearance. The wiring consists simply of four short wires from the distributor in the magneto to the four plugs, and two small wires to a switch on the dash. The water piping is unusually short, and the oil pipes are few in number. The inlet and exhaust pipes connect with passages forming manifolds in the cylinder casting proper, so they are less prominent than usual. Both the engine and the transmission are suspended at three points, and the transmission gives four speeds ahead, with direct drive on the third. The wheel base is 110 inches.

#### THE RAPID MOTOR VEHICLE COMPANY,

Pontiac, Mich., show a 5 ton, 60 horse power truck; one 3 ton, 45 horse power truck; four 2 ton trucks, two I ton trucks; one two cylinder, twelve passenger, 30 horse power sightseeing car; one four cylinder, 45 horse power, twenty passenger sightseeing car; one two cylinder, 24 horse power ambulance, and the I ton truck which went through the recert Glidden Tour and climbed Pike's Peak. The motors in the 5 and 3 ton trucks are four cylinder, with the cylinders cast in pairs, with the valves all on one side. The 5 ton motor is 51/2 inch bore and 61/2 inch stroke, while the 3 ton has 434 inch bore and 51/2 inch stroke. In the 3 and 5 ton trucks multiple disc clutches are used, with selective three forward speed sliding gear transmissions. The propeller shaft from the transmission connects with the jack shaft differential, and final drive to the rear wheels is by sprockets and chains from the jack shaft ends. The 2 ton truck and the 1 ton truck are nearly the same. except for a slight difference in wheel base and a one-quarter inch larger bore in the 2 ton truck. The motors used are double opposed, and on the I ton are 5 inch bore and 5 inch stroke, and on the 2 ton 51/4 inch bore and 5 inch stroke. Except on the two larger trucks the transmissions are planetary, with chain drive. The ambulance is very conveniently arranged, with stretcher for the injured or sick, seats for the attendants and lanterns and emergency medicines.

#### ACORN COMMERCIAL CAR.

This commercial car is not new, having been on the market for two years, but has not been shown at auto shows. It has a two cylinder opposed motor with shaft extended well to the rear. This shaft carries two small wide face friction pinions. A jack shaft across the car carries two conic faced discs, having three steps each, These may be separated to permit shifting the driving pinion to another step and then closed to give the proper driving friction. When driving, the contact is that of a perfect rolling cone, so there is no loss by slipping or unequal travel of the surfaces. as in most friction drives. There are three steps or surfaces on the large driven discs. providing three speeds forward. The reverse driving pinion can be pulled into place at the other faces of the discs to get a reverse direction. Since the driving pinion is between the driven discs these latter travel in opposite directions, and the motion of one is reversed by a pair of spur gears near one side of the chassis. Side chains carry the motion to the rear wheels. The centrol is on the left side.

# Electric Vehicles.

THE WAVERLEY COMPANY,

Indianapolis, Ind.—At this booth are to be seen three models. The 74 is an electric stanhope, especially adapted to doctors' use. It has a wheel base of 731/3 inches and a width of seat of 41 inches. The wheels are 32 inches diameter, and 3 inch front and 31/2 inch rear tires are fitted. These may be either solid or pneumatic. It is claimed that the new Waverley electric equipment is light enough to be carried practicably on air tires, and built strong enough to be safely and durably carried by solid tires. In all these cars an interlocking controller is used, which makes it impossible to accidentally do the wrong thing. Thus the switch key cannot be inserted if the power is turned on, but the power lever must be in neutral position first. Likewise it is not possible to reverse when the power lever is in full ahead position. This little precaution prevents accidents, such as have happened in the past by changing the direction of the current so suddenly as to turn the vehicle over backward or do some similar damage.

THE BABCOCK ELECTRIC CARRIAGE COMPANY are showing a gentleman's roadster, one victoria phaeton, a four passenger coupé and one runabout, especially designed as a doctor's car. These cars are all supplied with either steering wheel or lever guide, except the gentleman's roadster, which comes only with steering wheel. The gentleman's roadster is designed along the lines of a gasoline runabout, even to the filler cap at the top of what to all appearances is the radiator. This car has a forty-two cell battery divided between the front and back, and it is claimed to be able to ain a speed of 25 miles per hour. Each

of the other cars is equipped with a thirtysix cell battery, which is divided to equally distribute the weight. The gentleman's roadster has semi-elliptic springs in front and full elliptic in the rear, while the other cars have full elliptics all around.

#### WOODS MOTOR VEHICLE COMPANY,

Chicago, Ill,—The Woods electric vehicles have been built with special regard to practically everyday use, and so such features as solid tires are almost always used, the standard equipment including these in all cases. The same holds true of the battery, which is of forty cells instead of a smaller number less able to stand long hard service. The bodies are specially roomy, and the seats are claimed to be the widest used in any standard auto, measuring 46 inches. The motor is also believed to be larger than used on other electrics to ably carry the large body and battery. All of these vehicles are fitted with double chain drive, which secures flexibility, and annular ball bearings are used throughout. Four speeds forward are provided, which permits suiting the gearing to the work and power. Two coupés and two victorias are shown, one of the coupés being hazel and brown in color with dark brown trim, while the other is all black, with silver trim upholstered with gray and whipcord.

#### THE COLUMBUS BUGGY COMPANY,

Columbus, Ohio, besides their gasoline line, also exhibit two electrics, both of which are fitted with left hand control. One of these is the Model 1000, fitted with victoria top, and the other is the 1202, a coupé model, with enclosed control. A six speed controller is used this year instead of a five as formerly.

#### THE RAUCH-LANG CARRIAGE COMPANY,

Cleveland, Ohio, show one large extension, forty cell coupé, one roadster designed after the style of a gasoline roadster, and one victoria. The coupé has an 81 inch wheel base, and has, it is claimed, an average mileage of 75 per charge. The roadster has thirty cells, and gives an average of 65 miles per charge, and a speed of 25 miles per hour. It has steering wheel guide instead of lever, and has an 82 inch wheel base. The victoria has a wheel base of 76 inches. All models are equipped with electric brakes. The respective weights are 2,800 pounds, 2,000 pounds and 1,050 pounds.

# BAKER MOTOR VEHICLE COMPANY,

Cleveland, Ohio.—These well known electrics are shown in several styles and a chassis is mounted with its wheels off the floor, so it can be run to show the ease of operation. While in general these vehicles have been continued as in the past, the four passenger, extension front coupé is new and has been put out to meet a demand for a vehicle that can be driven from the inside. It is about 3 inches longer than similar chasses heretofore, and very commodious. The Model S runabout is neat, trim and speedy, being capable of

25 m. p. h., and well suited for business men. The roadster is on gasoline car lines, and has a speed of 30 m. p. h. It and several others have wheel steering, with the controller lever on the post, and are easily handled.

## Motorcycle Exhibits.

THE AURORA AUTOMATIC MACHINERY COMPANY,

Aurora, Ill., are the makers of the "Thor" motorcycle and parts, and show a line of these machines, both single and twin. equipped with both battery and magneto ignition. The distinguishing feature of these machines is the combined enclosed gear and chain transmission. They have on exhibition a new machine known as the Thor IV. This is somewhat of a departure from the regular lines. The motor cylinder and head are cast integral. This motor is guaranteed to give 4.7 horse power at the rear wheel. A special feature is the new automatic oiling device, of the centrifugal type. The motor is equipped with roller bearings on the crank shaft. Another special feature is a combined oil and battery tank. In this are carried 13/4 gallons of gasoline and 11/4 gallons of oil. When this machine is provided with battery ignition. a two unit coil is used. In this model the compensating sprocket is placed on the motor instead of on the rear wheel.

### THE HENDEE MANUFACTURING COMPANY.

Springfield, Mass., makers of the Indian motorcycle, show in all six machines, including three 234 horse power singles and three 5 horse power twins. Quite a number of new features have been adopted this year, including a new type of spring fork of the link type. The upright movable rods go up to a broad flat spring, which is used in preference to the usual type of coil spring. The main fork is now of the truss pattern. While the lubrication is on the splash system, an automatic pump driven off the crank shaft by a gear worm, which makes one stroke for about 36 revolutions of the motor, is used to feed the oil constantly to the crank case. The stroke of the pump can be adjusted. The whole device is no larger than the cam gear cover and is attached to the side of the crank case. The old hand pump is still retained for emergencies. A tubular stand is now made a regular part of the equipment of all the machines. All the twins of this make are now equipped with magneto igcition.

# THE N. S. U. MOTOR COMPANY,

New York, are exhibiting three models, a 3½ horse power single, a 3 horse power twin, and a 4 horse power twin. The 3½ horse power is equipped with what is termed an undergeared pulley; that is, a reduction is made to the belt pulley by a pinion on the motor shaft, which meshes with an internal gear on the V shaped

(Continued on page 547.)

# THE HORSELESS AGE

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# The Atlanta Show.

The first of the season's big national shows opened its doors at Atlanta, Ga., on Saturday last. Considering the relative newness of the Southern market it must be admitted that the industry is very well represented. The official list of exhibitors contains not less than seventy-five names of car manufacturers, which is more than have exhibitéd at any New York show for some years. In the Auditorium Armory Atlanta possesses a fine show building. Its central location and excellent railroad connections make it the natural distributing point for the South Atlantic States, and the energetic campaign for good roads and for the creation of automobile interest in that section. conducted by its leading citizens and its newspapers, certainly deserved recognition on the part of the industry.

The South does not have to pass through the same stages of automobile show development as did the big metropolitan cities of the North and the Middle West, where the earliest shows comprised only about a dozen different makes of cars each, and some cars about which the visitor was never certain whether they would actually run or not. Instead it can start with a show comprising every variety of motor vehicle, the products of a highly developed industry. That such a show is worth going a considerable distance to see by anyone at all interested in motor cars seems to be fully appreciated in the South, and judging by the attendance on the opening night the first Southern national show will be an all round success.

The plan of opening the new speedway or motordrome at Hopeville during show week and holding races there, including at least one big event every day of the week from Tuesday on, must be considered a very happy one. It gives the motor enthusiasts who come from a distance a chance of examining the principal cars now manufactured in this country, and at the same time view a series of races on a modern automobile track. That the races on the Atlanta track this week will be highly interesting may be inferred from the fact that what proved itself to be the fastest car in America the past season will there be pitted against the car which holds the world's record for speed. This should therefore prove a very strong attraction for all lovers of the sport.

The manner in which the show has been advertised deserves commendation, and the two great dailies of Atlanta, the Constitution and the Journal, deserve credit for the space which they have unstintingly given to the automobile and good roads movement during the past several months. The setting of the show and the decorations are excellent. Perhaps the only thing that stands in the way of a complete success of this Southern automobile week is the limited accommodations afforded by the hotels in Atlanta, but in this connection it is gratifying to note that the citizens and the authorities have done everything in their power to overcome this deficiency, even to the extent of suspending court sessions during the week, "because all hotel accommodations would probably be required by automobile show visitors."

# The Calculation of Chassis Springs.

In the present issue we print the second instalment of an article on chassis springs, by Messrs. Landau and Golden. From the first instalment, in our last week's issue, it

is quite evident that the manufacture of these springs at the present time is an empirical art. That is, the spring maker in selecting suitable springs for an automobile uses his judgment, is guided by the proportions of springs used on other similar chassis, and then tries and alters the springs until he finds a suitable combination. This method, it must be admitted, has led to excellent results in connection with horse carriages, and a proposal to calculate springs for horse vehicles from the modulus of elasticity of the steel, etc., would probably be scoffed at by a carriage builder. The motor industry, however, has materially changed the problems with which the spring maker has to deal. The greatly higher speed necessitates extremely sensitive springing, and the importance of light weight in a high speed vehicle makes the use of special steels almost imperative in the springs of high powered cars. The spring makers have had centuries in which to develop the carriage spring, while the automobile has progressed in a decade from a ten-mile-an-hour to a mile-a-minute vehicle, and the requirements with respect to the chassis springs have grown apace.

Carriage building is probably one of the oldest of the mechanical arts, and all its branches have been developed by cut and try methods. It was probably in connection with railroad engineering that modern engineering methods were first applied to the design of leaf springs. Most of the formulas for the calculation of leaf springs that are found in engineering handbooks, etc., were developed in connection with railroad work. The design of automobile springs involves undoubtedly still greater difficulties than that of railroad springs, for while the average speeds are not as great in the case of the automobile the amplitudes of the vibrations which have to be absorbed are far greater. That the problem of automobile spring design is susceptible of mathematical solution hardly admits of any doubt. We do not wish to be understood as claiming that any good mathematician can set to work and from the properties of steel alone design a proper set of springs for an automobile. A set of experience constants must undoubtedly first be determined by actual experiment, but after these have once been found they can be embodied in rational formulæ, which can then be used for the calculation of springs for any load and maximum speed. It is mainly these experience constants which have been lacking so far.

The article by Messrs. Landau and

Golden covers the subject quite thoroughly, and will, we are sure, be read with interest by every automobile designer and by many of the more progressive spring makers.

# Why the Carburetor Should Be Particularly Accessible.

In the struggle to attain accessibility of motor parts, which has been so successful in the main, and which has relieved the operator of a large part of the discomfort attendant upon the care of a motor car, the carburetor, it would seem, has not fared as well as most other motor elements. It is generally assumed that the carburetor should require very little attention, and that its adjustment, once perfected, should be satisfactory for long periods of time. However, in ordinary practice, carburetor troubles are rather frequent, or at least faulty operation of the motor is frequently referred to the carburetor. The recent very marked improvement in ignition apparatus has greatly reduced the attention required by this part of the equipment, so that carburetor derangements, at present, occupy a relatively larger place than formerly among the minor difficulties of motoring.

If weather conditions and fuel quality never changed, if perfectly clean gasoline were always obtainable, and if carburetor adjustments once made never worked loose or changed, there would be no real need of tampering with the carburetor. This is not to say, however, that it would be left alone by the average motorist. There are some deranged conditions of engine operation, the "diagnoses" of which are so close and difficult that an experimental change of carburetor adjustment is called for, although trial often proves that the defect lies elsewhere. The adjustments of a carburetor may thus have to be disturbed, although the adjustment may be all right. There is no doubt that wide changes of atmospheric temperature and pressure, affecting the height of the fuel level, the viscosity and rate of flow of the gasoline and the weight of oxygen per unit of volume in the entering air, do actually call for changes in adjustment. Then, too, carburetor float valves wear appreciably in service and cause changes of fuel level, lock nuts occasionally turn off and allow adjustments to become incorrect, and spring tensions vary in course of time. The circumstance which leads more frequently than any other to an unavoidable change in carburetor adjustment is the presence of foreign matter in the fuel. When dirt becomes lodged in the passage leading to the jet, by being caught under the needle valve, the natural way of removing it is to open the needle valve widely and to flush the obstruction out by "priming" or by allowing the engine to draw full charges and thus suck the dirt through the standpipe. Despite the use of chamois filters in filling funnels, settling pockets in the bottoms of tanks, separators and strainers, foreign particles are almost certain, at some time, to reach the carburetor and clog it. Dirty gasoline is still the source of a good deal of trouble, even for the most careful operators. and is the most common legitimate reason for the disturbing of carburetor adjustments.

Upon cars making use of gravity fuel feed, the carburetor is usually placed on one side of the motor at just as low a point as possible and clear the underpan. In modern cars of long wheel base, especially those with six cylinder motors and with the front seats located well to the rear (an extreme case being the six cylinder runabout), the gasoline tank under the seat is a long way from the carburetor, and when the car is ascending a steep hill, with the tank only partly filled, the gravity head supplying fuel to the carburetor becomes little or nothing. Thus the carburetor must needs be placed just as low as possible to encourage the flow of fuel. With the pressure feed system carburetor location is not restricted by any such considerations, but there is, very properly, a disinclination to employ it upon the part of manufacturers, on the ground that the complication entailed is not generally warranted.

Even though the carburetor has to be placed at the lowest available point, barely clearing the underpan, the situation would not be so bad were all adjustments capable of being made from above; but, unfortunately, a considerable proportion of carburetors have their needle valve adjustments protruding from the bottom of the vaporizing chamber. It is thus necessary to contort the hand into the dirty, oily space between the carburetor and the pan in order to turn the adjusting screw, and the operation is the more difficult because one cannot see what one is doing. A small section is sometimes cut out of the underpan directly beneath the carburetor so that from under the car the adjustment may he reached, but this is a poor remedy. One manufacturer has gone so far as to provide the needle valve stem with a small spur pinion and to mount upon the side of a carburetor a vertical shaft with a thumb piece upon the upper end and a spur gear upon the lower end, meshing with the gear upon the needle valve stem. This enables adjustments to be handily made from above. It is much better to so design the carburetor that the needle valve stem projects upwardly through the top of the vaporizing chamber, and it is believed that all carburetors should be built this way. The practice is by no means universal at present, however.

Whenever the carburetor has to be dismounted for a thorough cleaning or for any other reason, and whenever the strainer, which is sometimes placed at the entrance to the float bowl, has to be cleaned, the fuel supply pipe must be disconnected. Almost universally this pipe enters the fuel bowl at the bottom, and one works in the dark in a dirty and confined space to break the union. It would be much better were the fuel pipe permanently fastened to the fuel bowl inlet, and the union transferred from beneath the carburetor to a more accessible position.

Even the auxiliary air adjustment of some carburetors is made from beneath, and it is a very dirty and painful job to perfect the adjustment, working "out of sight," and to securely tighten the locknut by means of a wrench which will barely turn in the restricted space. There seems very slight excuse for an air adjustment so unhandily placed, but it will be found on thousands of cars.

Every commonly used adjustment should, it is believed, be brought out from the top or side of the carburetor if the carburetor is to be placed in accordance with existing practice. Where a dashboard adjustment of the needle valve or of the auxiliary air valve is provided the situation is, of course, greatly bettered.

#### Coming Events.

November 6-13—National Automobile Show, under the auspices of the N. A. A. M., at Atlanta, Ga.

November 20-21-New Orleans, La., Two Day Track Race, New Orleans A. C.

November 22—Flag-to-Flag Reliability Run, from Denver to City of Mexico.

December 29-30—Philadelphia (Pa.) Annual Midwinter Endurance Contest, Quaker City M. C. December 31 to January 7—New York City Annual Show, Grand Central Palace, American Motor Car Manufacturers' Association.

January 8-15—New York Annual Show, Madison Square Garden, Association of Licensed Automobile Manufacturers.

February 5-12, 1910—The Ninth Annual National Show at Chicago, Ill.

February 22-26—Kansas City, Mo., Fourth Annual Show, Convention Hall, Kansas City Automobile Dealers' Association.

# Recent Tendencies in Ignition Equipment—Some New Systems.

# By Albert L. Clough.

Ignition equipments exhibiting wide diversity are to be found upon the new cars for the 1910 trade. At one time, not very long ago, it looked as though a great many manufacturers were likely to adopt the high tension magneto as the sole ignition source, and to dispense entirely with the battery, as has been done by so many of the foreign builders. This, however, has been done by only a very few car builders, as most users seem to desire an alternative system, which is at least capable of starting the motor from the seat and which is partly independent of the magneto. The dual system, in which a battery current acts through the magneto coil and distributor and a make and break upon the magneto shaft, seems to be very popular. If, as in one dual system, there is a special make and break device carried on the magneto shaft, which performs the function of interrupting the battery current only, and a special coil, the battery system becomes mors nearly independent of the magneto system than otherwise and thus a more effective safeguard against ignition failure. ability to spark at the motor by the use of a button which makes and breaks the battery circuit is a great convenience, but it is probably true that the dual system is rather frequently confounded with the double system by those who are not "up" on ignition details and more confidence placed in its "dual" feature than is actually warranted.

It is likely that magnetos capable of giving a spark by manipulation from the seat, but without the assistance of a battery, will soon be upon the market in variety, and, if this proves to be the case, there will be less incentive to use the present form of dual system, which is mainly useful for its self-starting feature and for the ability which it gives the operator to run his engine at a lower speed than that at which many makes of magneto will generate effectively.

SEAT STARTING MAGNETOS.

There seems to be considerable activity among magneto manufacturers in working out this seat starting feature. The favorite method of attacking the problem is to so arrange matters that a motion of the spark timing lever shall produce, in one way or another, a sufficiently rapid cessation of the magnetic flux enclosed within the armature conductors, to cause a discharge. Some magnetos of conventional design can be made to develop a quite reliable spark by a sudden movement of the timing device and recently a magneto of a special nonrotary type has been brought out, which makes a special claim for seat starting ability.

#### CLEARING THE DASHBOARD.

True double ignition, consisting of two absolutely separate and independent systems,

seems to be looked upon with favor by most automobile users, and is to be found upon a large fraction of the cars which are carefully equipped. Assuming that a high tension magneto is to be used for the primary system, almost universally, there is still a great deal of variety noticed in the choice of the secondary or standby system. One tendency is quite noticeable, namely, to so arrange both systems that they shall encumber the dash as little as possible. This is in line with the general movement to remove everything from the dashboard save the electrical switches and occasionally an oil telltale. The so called direct high tension magneto, which makes use of no separate "step up" coil, conforms to this tendency very naturally, as a simple switch is the only portion of the system external to the magneto itself and this takes up but little space upon the dashboard. There is no reason why the plain coil, employed in connection with the indirect high tension magneto, should not be placed under the hood and the switch only be mounted upon the dash. In fact, the only classes of apparatus which it is desirable to fasten to the dash are those which require frequent adjustment, or which must be under the constant observation of the operator. It is becoming quite customary for plain coils and even electrical apparatus which requires only very infrequent adjustment to be placed under the hood. Perfectly tight oil, water and heat proof containing cases, usually of pressed steel, are provided for this kind of apparatus, and usually some shortening or simplification of the wiring is brought about by an under the hood location.

## MULTIPLE VIBRATOR COILS.

The multiple vibrator coil system appears to be losing ground as the secondary or standby system, for it is bulky and is almost necessarily mounted on the dash, in order that the vibrators may be easily looked after. Upon many cars equipped with double ignition it is used very rarely indeed, and there seems to be an impression that "its room is better than its company." It seems to be the feeling that the standby system, considering how little service is required of it, must be unobtrusive.

As substitutes for the multiple vibrator coil arrangement various special battery saving systems are being quite widely adopted, and also the single coil and distributor arrangement. The master vibrator system is also gaining some prominence on the ground of its synchronous feature.

#### BATTERY SAVING SYSTEMS.

A great deal of skill is being expended in the development of battery saving systems. These are generally of the single make and break per ignition type, and the same circuit controlling device sparks all

cylinders, so that uniformity of timing may be secured. If the closure of the circuit is made only long enough properly to charge the coil, and is arranged so that its period is independent of engine speed, current economy is promoted and battery life increased. Such economical systems tend toward the use of dry cells. It is not uncommon to secure a mileage of 1,500 from a single set of six dry cells used in connection with such an ignition arrangement. When used as a standby system this means that in. ordinary use the cells deteriorate by age rather than use, and it is cheaper and better to put in a set of dry cells at long intervals than to maintain a storage battery, with its necessary periodical freshening charges, replenishments of liquid and so forth.' The employment of electric lights has an opposite effect as regards the choice of the battery to be installed, and tends to favor the use of the storage, which is capable of operating the lights and supplying the ignition system as well.

#### LOCATION UNDER HOOD.

The special ignition systems referred to are, many of them, intended for location under the hood, with the switch only upon the dash. Plain coils are, of course, the rule. One special type includes, in a single shaft mounted unit, the make and break, the distributor and the coil, the condenser only being separate. While mechanical means are generally resorted to for the operation of the make and break, in one system the single break per ignition is brought about electrically.

Low current consumption is, as a rule, indicative of a low rate of wear at the break points, and thus these current saving systems tend to require very infrequent adjustments. Now that the multiple vibrator coil system has lost some of its prestige, the advance into popularity of special systems of battery ignition, wherever battery systems are required, seems likely to be rapid, insuring, as most of them do, better synchronized ignition, higher current economy, less frequent attention, and reduced obtrusiveness of the apparatus.

#### SINGLE COIL SYSTEMS.

A few years ago the average manufacturer was very timid about adopting the single coil and distributor system, but now the high tension distributor has become such a familiar device upon magnetos, and as a part of successful special battery systems, that manufacturers do not hesitate to install it, with a single vibrating coil as the standby battery system, even upon the best cars. The single coil, even if placed upon the dash, takes up very little room, but there is probably very little real need of placing any secondary ignition apparatus on the dashboard, for it is used so little

that adjustments are very uncommonly required.

Carrying out the idea of the self contained power plant, it is becoming quite common to mount the stationary apparatus of special battery systems directly on the engine, the switch and battery wires being the only ones requiring to be detached if the engine is dismounted.

Certain of these special battery systems, while not employing a vibrator circuit breaker in ordinary service, embody one as a part of the equipment to be used in starting the motor from a cold condition or in "sparking up" from the seat, the idea being that a succession of sparks for a perceptible period is more effective in igniting a weak or cold charge than is the single spark. With a similar idea in view, one inventor so arranges matters that a very powerful current is allowed to pass at starting, which is reduced to a normal value after the motor is in regular operation.

#### HIGH FREQUENCY SYSTEM.

In order to do away with the objectionable features of the vibrator and still to retain whatever advantages the multiple spark system may possess, a high frequency system has been brought out. This substitutes for the usual electro-mechanical vibrator the natural wave period of a circuit containing an induction coil and a condenser. When the circuit containing this carefully proportioned inductance and capacity is broken by the timer, the discharge is of an extremely rapid oscillatory nature, and when this high frequency current is distributed to a small step-up coil, located at the plug, which is in the firing order, a high frequency discharge results at the plug gap.

This is certainly a neat manner of avoiding the use of a vibrator, by thus insuring, through the electrical characteristics of the circuit, the desired oscillation which is claimed to be exceedingly rapid and of special efficacy in firing the charge. As there is nothing about the apparatus to adjust, all parts of it except the switch are placed under the hood. This system is specially recommended by the makers for use with a low tension geared magneto, since there is no vibrator to be burned by the magneto current.

#### MASTER VIBRATOR.

The master vibrator system, which is a form of apparatus that may be regarded as intermediate between the multiple vibrator coil system and the single coil and distributor arrangement, has lately been taken up by a number of coil manufacturers and put into thoroughly reliable form. It appeals to those who desire closely synchronized ignition, but who do not care to use the high tension distributor. By careful design the master vibrator may be made to require a minimum of attention, practically none, when used as a part of the standby equipment.

GREAT VARIETY OF SYSTEMS.

This variety of battery systems is rather

bewildering, and almost anyone will find among their number one which suits his peculiar taste. While battery systems have here been spoken of in the capacity of auxiliary, secondary or standby equipment, it is not to be forgotten that any good, synchronized battery saving system which is free from the need of frequent adjustments is a close competitor of the high tension magneto as regards fitness for serving as the primary equipment. Cars using such systems are extremely satisfactory, but, never-

theless, the magneto is almost universally accepted as the logical means of primary ignition.

If the magneto is rendered self sparking from the seat, will battery ignition systems be forced into an even more secondary position than at present, or will the widespread use of electric lights and the necessity of carrying batteries of large capacity tend toward a limitation of the use of the high tension magneto and the adoption of battery ignition systems? Time only can tell.

#### The Phonendoscope.

The phonendoscope is an instrument intended to be used for definitely locating the various operative noises which are set up by a gasoline motor. Manufacturers in the work of refining their motors in point of quietness often require a means of minutely studying the sounds emitted by each operative part, as a preliminary to their reduction or elimination, and repair men and users frequently need a reliable means of definitely locating knocks or other noises which are evidences of abnormal conditions.

The ordinary physician's stethoscope has been employed for this purpose to some extent, but its indications are of a rather indefinite character on account of the fact that the sounds from several parts of the motor enter the bell and act upon the diaphragm simultaneously, giving a confused indication. The stethoscope, furthermore, is too short to allow of all parts of the motor being reached conveniently by the observer, and the bell is not of proper construction to give good results.

In the phonendoscope the usual form of stethoscope double ear pieces, lightly pressed together by a spring, is retained, but this is connected to the diaphragm box by means of two separate flexible tubes of good length. To the diaphragm is secured one end of a resonant hard rubber rod of considerable length, and the other end of this is provided with a button which may be placed in contact with any part of the motor. Sound vibrations are conducted from the motor through this rod and cause the diaphragm to vibrate, setting up sound waves which traverse the flexible tubes and the

ear pieces, and are heard by the observer. The ear pieces cut off extraneous sounds from the observer, and the diaphragm is affected only by sound waves sent out by the part of the motor with which the end of the rod is in contact.

In using the instrument the rod end is held by the operator or his assistant against that external portion of the motor which is in the closest proximity to the working part the operative sounds of which are to be studied.

The accompanying illustration shows the recommended positions of the rod for the detection of various motor noises, the list being by no means complete:

Position A locates piston ring and piston pin knocks.

Positions B and C locate loose pistons and premature explosions.

Position D locates noisy push rods and defective cams.

Position E locates worn valve guide of valve seating heavily.

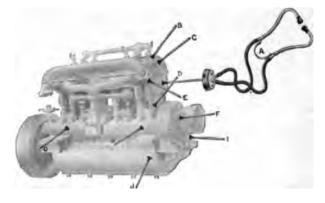
Positions F and I locate tightly meshed worn or out of true gears.

Positions G and H locate noisy cam shaft bearings.

Position J locates loose connecting rod tips, main bearings and crank shaft end play.

The phonendoscope is to be had from the American agents, Messrs, G. P. Pilling & Son Company, corner Arch and Twentythird streets, Philadelphia.

According to official statistics Roumania imported automobiles to the value of 1,523-622 francs in 1907, as compared with 1,170-658 francs in 1906.



SHOWING USE OF THE PHONENDOSCOPE.

# Calculation of Chassis Springs—II.

# By David Landau and Asher Golden.

#### DEFLECTION AND FLEXIBILITY.

We will discuss first the subject of deflections and make a critical examination of some of the existing formulas for finding this factor. We have looked up a great deal of the available literature on this subject and have failed to find universal agreement among engineers as to the correct expression for the deflection. There are a number of good formulas, it is true, but these are of little value unless used in connection with some constant or correction factor derived from actual experience with a great number of springs.

The total deflection under a given load, or the deflection per unit load, which we call the flexibility, is the factor which determines the "softness" or the "hardness" of a spring. If the flexibility is too low the spring is too "hard" and vice versa. Another, perhaps better, way of expressing this characteristic is by what Lanchester calls the "suspension period." This he defines as the time required for the spring to make one complete oscillation. The spring is "hard" if the period is too short and vice versa.

With certain restrictions the spring may be treated as a pendulum. The time (T) in seconds required to make one complete oscillation of a simple pendulum is expressed by

$$T = 2 \pi \sqrt{\frac{l}{g'}}....(1)$$

where *l* is the length of the pendulum in feet. This holds true, provided the string by which the weight is suspended is inextensible and weightless, the arc of swing is small, and there are no friction losses.

If we take a spring, Fig I, supposed to have no inertia, and support at the point A a particle so that the stress exerted in the spring by virtue of the action of gravity on the particle keeps the spring in equilibrium when deflected a distance d, then it can be shown that the motion of such a particle is a simple harmonic, and its period is

$$T = 2 \pi \sqrt{\frac{d}{g}} \dots (2)$$

which is the same as equation (1).

This expression holds true for a spring consisting of a single leaf where there is no friction. Where more than one leaf is employed friction plays an important part in tending to damp the oscillations, and must therefore be taken into consideration. If  $\mu$  be the coefficient of friction between the leaves, then equation (2) may be more correctly written

$$T = 2(l + \mu) \pi \sqrt{\frac{d}{g}} \dots (3)$$

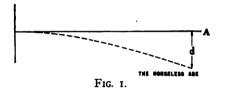
The following table shows the number of complete oscillations per minute. The figures in column 1 are computed from equa-

tion (2) and those in column 2 from equation (3):

Deflection	Complete Oscillations			
in	Per Minute.			
Inches	Column 1. Column 2.			
1	188 157			
1½	153 127			
2	133			
21/2	120 100			
3	108 90			
3½	100 84			
4	94 78			
4½	88 74			
5	83 70			
5½	80 67			
6	77 64			

Lanchester has found that in practice an oscillation period of two-thirds of a second—that is, a frequency of 90 oscillations per minute—gives an ample degree of comfort. This corresponds to a deflection of about 4 inches, from equation (2).

Calling into operation equation (3) and assuming that under good running conditions—spring leaves properly ground and lubricated— $\mu$  is .16 to .20, we find that 90 oscillations per minute corresponds to a deflection of about 3 inches, which is 75 per cent. of that found from equation (2).



This is sufficient to make a noticeable difference in the riding qualities of the springs. But, aside from this, it seems to us preferable to work from the oscillation period rather than from the flexibility, although these terms are mutually convertible. For example, we will take for granted that a spring is to have a total deflection of 3.5 inches for easy riding and is to sustain a load of 750 pounds. This will give approximately an oscillation period of 80 to 90 per minute. The flexibility will then be

$$\frac{3.5 \times 100}{750} = .5 \text{ inch per 100 pounds.}$$

The designer is now in a position to specify the load the spring is to sustain and the total deflection desired. Or, in place of these, the flexibility. From either of these specifications—the load and total deflection, or the flexibility—the spring maker should be able to supply the proper spring.

It is seen from the above that the flexibility of a spring is inversely proportional to the load to be carried. The greater the load the less will be the flexibility. For example, for a very light car the flexibility may be as great as 1.5 to 2 inches per 100 pounds, and for a very heavy car as low as .15 to .18 inch per 100 pounds.

The question of clearance very often has considerable influence on the flexibility. The distance betwen the axle and the frame may be so short as to cause one to strike

the other unless the springs are made unduly hard. A certain load may be specified by the designer and the springs supplied to carry the load may be found too great for the clearance. The fault here rests entirely with the designer for failing to specify the clearance. The permissible deflection is also limited by the material of which the springs are made. If the material is very flexible—that is, has too great an elastic elongation—a greater number of leaves will be required to prevent the springs from settling under the load.

#### DEFLECTION.

It is important to find the deflection of a spring under a given load. There are several formulas for finding the deflection; some of these are purely empirical and are of value only when used in particular cases. They are of no value otherwise, since it is practically impossible to find suitable constants or correction factors so as to make them applicable in a general way.

The following formulas are the ones most generally used; some are based on the elastic equation of a centrally loaded beam supported at its ends; others on a cantilever with a concentrated load at its free end:

No. Formula.

(1)  $d = \frac{3 \text{ W L}^3}{8 \text{ E} n b t^3}$  Authority—

Goodman,

"Mechanics Applied to Engineering."

(2)  $d = \frac{6 P l^3}{E n b l^3}$  Authority—Reuleaux, "Constructeur."

(3)  $d = \frac{5 \cdot 5}{E} \frac{P / s}{n b t^3}$  Authority—Henderson,

Trans. A. S. M. E., Vol. XVI.

4)  $d = \frac{1.66 L^3}{L}$  Authority—

(4)  $d = \frac{1.00 \text{ L}^3}{b \text{ n } t^3}$  Authority—Clark, "Railway Machinery," 1855.

(5)  $d = \frac{6 l^3}{n b l^3} \frac{P(1+p \tan a)^*}{E} \frac{Authority}{"Hutte,"}$ 

"Ingenieurs Taschenbuch."
\* See Fig. 2.

(6)  $d = \frac{4}{E} \frac{l^3}{n b l^3}$  Authority—
Molesworth

Authority—
Authority—

(7)  $d = K \frac{P l^3}{3 E I}$  Authority—

seau, Chief Engineer, Etablissements

Lemoine.

(8)  $d = \frac{W L^3}{4 E n b l^3}$  Authority—
Pocketbook.

(9)  $d = \frac{S L^2}{4 E H}$  Authority—Morrison,
"Spring Tables."

For semi-elliptic springs with all leaves graduated.

(10) 
$$d = \frac{1}{2(2+r)EH}$$
 Authority—

"Spring Tables."

Authority—

Morrison,

For semi-elliptic springs with part of leaves graduated.

In the above formulas:

L = length of the spring under load.

l = half length of the spring = L/2.

d = deflection of the spring under load.

W = total load on spring in pounds.

n = number of leaves.

t = average thickness of the leaves.

b =width of leaves.

E = modulus of elasticity in bending.

I = moment of inertia about axis parallel with the width.

P = load on one end of spring = W/2.

K = a constant = 1.2 to 1.5.

S = fibre stress (80,000 pounds per square inch).

H = free height of spring.

r = percentage of full length leaves.

In equation (4) d is the deflection in sixteenths of an inch per ton of load; b is the width of the leaves in inches; t is the thickness of the plates in sixteenths of an inch.

In equation (6) d is taken in inches per ton of load and E=16,000 tons per square inch

If in equation (5) we make p = 0, we have

$$d = \frac{6 P l^8}{E \pi b t^3},$$

which is the same as equation (2).

If in equation (1) we make W=2 P and L=2 l, we have

$$d = \frac{3 \times 2 P \times (2 l)^3}{8 E n b t^3}$$

which is the same as equations (2) and (5).

Equation (3) is the same as equations
(1), (2) and (5), except that an allowance is made for several top leaves which are all the same length.

If in equation (8) we substitute for W its equal 2 P and for L its equal 2 l, this becomes

If in equation (6) we multiply the second number by W/2,000, the value of E becomes 32,000,000, and d is then given in inches actual deflection and is the same as that given in equation (11).

If in equation (7) we disregard the constant K, introduce the factor n (number of leaves), and substitute for I its equal  $bt^3$ , this equation becomes the same 12 as (11).

We see from the above that equations (1), (2) and (5) are the same; these consider the spring as a beam supported at its ends with a central concentrated load. Equations (6), (7) and (11) are also similar; these consider the spring as a cantilever with a concentrated load at its free end.

It is immaterial which of the above six equations we apply, provided care is taken to introduce the proper constants, in which case all six will be found to give the same value for the deflection.

We will now apply equation (2) to two actual cases and compare the values found with actual measured deflections. The two springs considered were made abroad and are regarded as good suspensions; that is, they have the proper flexibility for the

loads. The characteristics and dimensions are as follows:

P = 200 kilograms = 440 pounds. l = 500 m/m = 19.7 inches. b = 50 m/m = 1.97 inches. t = 6.65 m/m = .262 inch.n = 0

E = 20,000 kg. per sq. m/m

= 28,300,000 pounds per

square inch.

Substituting in equation (2), we have

$$d = \frac{6 \times 440 \times 19.7^{3}}{28.300,000 \times 9 \times 1.97 \times .262^{3}} = 2.237$$
inches.

The actual deflection of this spring was found to be 1.89 inch.

The following example is that of a smaller spring having the following characteristics and dimensions:

 l = 450 m/m = 17.7 inches,

 b = 45 m/m = 17.7 inches,

 t = 6.35 m/m = 0.25 inch.

 n = 6 E = 28,300,000.

Making the necessary substitutions, we find d to be 1.56 inch. The actual deflection of this spring under the specified load was 1.42 inches.

Proceeding in this way, we constructed the Table I for semi-elliptic springs. The data and dimensions were placed at our found from equation (2). From the last column we have D/d = .86, or D = .86d; that is, the actual deflection is 0.86 of the calculated deflection. We can now write equation (2) as follows:

$$D = 0.86 \frac{6 P l^3}{E n b l^3} \dots (12)$$

The constant 0.86 practically represents the deficiency due to the coefficient of friction, which in the above cases should be taken at about 0.14 to 0.16; that is 1-086 The springs from which the above table was constructed had their leaves ground on both sides, and were well oiled. It is evident that if the leaves were dull the ratio of the measured to the calculated deflection would be lower than that given in the table. The constant in this case would be  $(I - \mu)$  where  $\mu$  is the coefficient of friction. We see now that we can get a very close approximation to the actual deflection by multiplying the right hand member of equation 2 by  $(1-\mu)$ ; we then have

$$d = (1 - \mu) \frac{6 P l^3}{E n b l^3} \dots (13)$$

This formula will now apply to any semielliptic spring provided we know the values of E and  $\mu$ . It must be remarked, however, that the value of d from equation (13) applies to a free spring; that is, one not secured to a spring seat, and the values of the calculated and measured deflections given in the table have a similar application.

Table I.									
Length				Average	Calculated	Measured			
Under	Load	Number	Width	Thickness	Deflection	Deflection	D		
Load.	on Spring.	of Leaves.	of Leaves.	of Leaves.	d.	D.	-1		
100)	300	7	50	6.57	56.5	48	.86		
1000	200	6	50	6.18	52.9	46	.87		
1050	350	7	55	6.71	65.4	56	.858		
1050	400	8	55	6.75	64.2	54	.842		
1300	300	8	50	6.06	139.5	1 20	.867		
1 300	350	8	50	6.38	139.0	1 26	.905		
1400	300	7	55	6.36	160.0	138	.863		
1400	400	9	55	6.39	159.0	140	.878		
1450	500	10	55	6.85	162.0	140	.864		
1450	600	11	55	7.00	165.0	141	.854		
1500	650	10	6o	7 - 45	166.0	143	.862		
1500	700	11	6о	7.50	159.0	140	.878		

disposal by the Etablissements Lemoine, who consider the springs to be "good suspensions." Dimensions are given in millimeters and loads in kilograms. It may be well to remark here that all the numerical calculations and the constructions of the tables in this article were made with a 10 inch slide rule.

Referring to the last column of this table we note the interesting fact that the ratio of the measured to the calculated deflection is a constant, practically 0.86. This is sufficient to show that equation (2) will give correct results provided the second member of the equation is multiplied by some constant. This equation, as well as the cantilever equation, applies to an ideal spring; that is, one in which there is no friction between the plates. If we consider friction, it is evident that the calculated deflection will have a lower value than that

The fact that the spring is secured to a seat will not materially affect the deflection.

The deflection given by equation (6) is only two-thirds of that given by equation (2). It is seen, therefore, that the calculated value of d from equation (6) is lower than the actual deflection, a result that cannot be justified. The calculated deflection should in any event be greater than the actual. We are therefore led to accept equation (2) as being correct for theoretical deflections and equation (13) for actual deflections. But, as is pointed out above, it is immaterial whether we employ one equation or the other, provided we use the proper constant. We ourselves prefer to use equation (7), giving to K the value 1.2 to 1.5. This constant depends on the condition of the surfaces between the leaves and therefore serves the same purpose as the constant (1-4) in equation (13).

# DESCRIPTIONS OF NEW VEHICLES AND PARTS.

#### The Winton Six for 1910.

radical changes will be found in the on Six, manufactured by the Winton r Carriage Company, of Cleveland, for 1910, but many little refinements been introduced which will increase ar's merit. While the motor remains ame as before, the multiple disc clutch per cent, larger in diameter than in and with four springs requires but foot pressure for operation. The mission now has four forward speeds ad of three, a new extreme speed haveen added. A new perfected carburetor to the efficiency of the motor. The e is inswept in front to give a shorter ng radius. The springs are of ined size and are semi-elliptic all around, itting low suspension of the body. Four absorbers and four rubber bumpers now fitted. The front axle is of chanection pressed steel. The wheel base 4 inches, an increase of 4 inches. The is longer and wider, with bucket seats ard and wide tonneau doors. Seven nger equipment is extra. The running Is and guards are wide, and the rear is drop over the wheels. The running is and front floor boards are covered pressed aluminum.

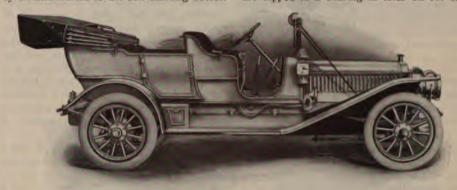
her new features are as follows: New n radiator with longer tubes, longer cap of hard rubber, and hard rubbering wheel rim; longer spark and throtevers on steering column, increased leverage, solid brake spiders, long or pedals at buyer's option, carburetor or on dash, improved design of auxilgasoline tank on dash, dual ignition with ge battery for starting, larger oil tank, e cups on springs, larger exhaust tube, r front universal joint with lubricant ner. The use of the self starter intro-

duced two years ago is continued and the starting crank is carried in the tool box.

In the brake lever segment is drilled a hole to receive a padlock. When the lever is drawn past this hole and the padlock is inserted the clutch is out and the brake is applied, so that the car is protected against theft. A feature of interest is that of mechanical inflation of the tires. This is done by an attachment to the self starting device.

angularity of the connecting rods and equalizing the side thrust against the cylinder walls. Long connecting rods and long pistons in connection with the offset crank shaft also aid in reducing side wear.

Each cylinder is submitted to a hydraulic test of 300 pounds per square inch and is ground to size, and after the engine is assembled the cylinders, pistons and bearings are lapped to a bearing in clear oil for six



THE 1910 WINTON SIX.

A tube supplied with the car is attached at one end to the self starter cock on the dash and at the other end to the tire to be inflated. When the valve on the dash is opened the compressed air flows at once from the pressure tank to the tire.

The motor is a six cylinder, four cycle, water cooled one, with 4½ inches bore and 5 inches stroke, and has low three point suspension. All moving parts except the flywheel are enclosed. The water jackets are open on each end and one side of the cylinders, making it possible to thoroughly remove scale or dirt that may accumulate inside by removing the covers of the different openings. The cylinders are offset from the centre of the crank shaft, thus reducing the

hours. The piston has three eccentric rings with step laps. These rings are ground on three sides and are pinned in place. The piston pin is hollow, 13% inches in diameter and 411 inches long, and is held in place by two set screws which are locked with a spring steel wire. The pin is slit at each end and is secured by tightening the retaining screws. The piston has an oil groove about 3/4 inch wide and 1-64 inch deep around it where the piston pin holes are, which catches the oil and aids it to get to the hollow piston pin. There are four small oil grooves below the piston pin on the piston for smoothly distributing the oil from the splash.

The connecting rod is a drop forging of I section. The top bearing is of phosphor bronze, 11/8 inches in diameter and 2 inches long, and slotted at the top to catch oil from the splash. The lower bearings are of white bronze, 134 inches in diameter and 2 inches long. The crank pin bearing cap, instead of being ported at right angles to the rod, is ported at about 45 degrees, making it easy to adjust without tearing down the whole motor. The valves have nickel steel heads 21/4 inches in diameter, which are electrically welded to cold rolled % inch stems and have 36 inch lift. The valves are actuated by roller plunger with provision for adjustment. The valve springs, plungers and valve chamber plugs are covered by readily detachable pressed steel plates. The cams are hardened and ground internally and externally, and are keyed to the nickel steel cam shaft, which is also ground to accurate size. The cam shaft has six liberal bearings, which are provided with pockets to catch the oil from the splash for lubri-



CARBURETOR SIDE OF WINTON SIX CYLINDER MOTOR,



CARBURETOR.

cation. The cam shaft gear and fan and pump shaft gear are housed in an oiltight compartment which forms an integral part of the crank case.

The crank shaft is a drop forging of special heat treated nickel steel with the cranks set at 120 degrees. It has four bearings. The front bearing is 314 inches long, the second 33% inches long, the third 33% inches long, the fourth and last 33% inches long, and all are 134 inches in diameter. These bearings are bushed with white bronze.

The crank case is of aluminum alloy with three 5x8 inch hand holes. Each connecting rod has its individual splash basin, which is curved and maintains a constant level of oil on a grade or on the level. The case is divided vertically into right and left halves to provide for the ready removal of the crank shaft, connecting rods and pistons, without disturbing the cylinders or motor accessories.

There are an oil drain at the bottom of the oil manifold for flushing the case and a bleeder pipe to relieve crank case compression.

Water circulation is secured by a gear driven centrifugal pump. The water is filtered before it passes through the pump in the filtering chamber at the bottom of the pump. It is impossible for the water to clog the radiator or to cease circulating even though the pump should become deranged, as in that event the water passes through the pump chamber and the circulating systems on the thermo-siphon principle. The new radiator consists of vertical copper tubes with pins. The tubes have been lengthened 1 inch. The radiator filler is lengthened an inch and has a notched hard rubber cap. The back of the radiator is housed, except for the circle in which the fan operates, thus causing a conducted draught over the radiating surfaces. The radiator fan is gear driven through a friction clutch.

A force feed lubrication system is used with a continuous sight feed on the dash. A plunger pump, operated by an eccentric on the rear end of the crank shaft, takes oil from the oil tank at the left side of the

motor and delivers it through leaders to the crank shaft main bearings and the front gears. A second plunger pump operated by the same eccentric draws the oil from the crank case and returns it to the oil tank, where it passes through a strainer before being used again. The flow of oil is proportional to the motor speed and the quantity is regulated by a bypass. The cylinders are oiled by splash. The crank shaft is drilled from each main bearing to one of the crank pin bearings, so that the surplus oil is carried from there by centrifugal force to the crank pin bearing.

The carburetor has a single nozzle and a double throttle. The throttles act in conjunction with fuel valves to gradually increase the fuel supply. There is no automatic air valve. The carburetor is located on the opposit side to the valves and connected to the inlet manifold through a Y shaped pipe passing over the top of the cylinders. The motor is throttled mechanically by a lever from the steering column or foot button at the driver's right foot. A primer is located on the dash.

The Bosch dual system of ignition with a single set of spark plugs is used, and the plugs are placed horizontally over the intake valves. Attached to cylinders I and 6 are outlets through which a small portion of each charge of burning gas passes to a pressure tank placed between the left frame rail and the driving shaft. Here the pressure is stored until required to start the motor, when a cock is opened, allowing the gas to flow through the distributor to one of the cylinders. The pressure forces this piston down; at the same time another piston passes the firing point and the motor starts. However, if for any reason the first cylinder should fail to fire, the distributor sends the gas to the next cylinder in order and forces the next piston past the firing point, and so on. The self starter has but one moving part, the distributor.

The gasoline is forced from the 23 gallon tank at the rear of the car by a small plunger air pump in the crank case, driven by the same eccentric that drives the oil pumps, under 2 pounds pressure to a patented auxiliary tank on the dash which allows the gasoline to flow by gravity to the carburetor. The main tank is provided with a reserve supply compartment holding 3 gallons and an air dome which prevents the gasoline backing into the air lines.

The multiple disc clutch consists of sixtyseven steel discs, of which thirty-three are keyed to the transmission shaft and thirtyfour to the driving spiders which are connected to the flywheel. The discs are 50 per cent. larger than heretofore, and run in an oil bath and are carried on annular ball bearings. The clutch is contained in the transmission case and is accessible through a hand hole. Four springs placed at equal distances around the clutch distribute the tension equally on the discs. The springs are easily removed or replaced. The clutch and hand brake lever are connected so that FRONT SPRING, SHOCK ARSORDER AND SECTION OF the application of the emergency brake re-

leases the clutch. A selective type sliding gear transmission operating in an H qualrant with four forward speeds and revent is used. Direct drive on third speed and high speed on fourth. Both shafts are carried on annular ball bearings. The several shifting yoke shafts are provided with locking devices to prevent two sets of gears becoming engaged at the same time. The propeller shaft between the transmission and rear axle is provided with two universal joints of the roller and trummion type and between the flywheel and the clutch there is a double universal, the ends of the shifts being squared and working in a hardened sleeve with a squared centre. The rear miversal of the propeller shaft forms part of the main drive pinion shaft, which is carried on Timken bearings, and to which the bevel drive pinion is keyed and held in place by a nut and lock nut.

The rear axle is full floating, there being no load on the driving axle, the weight of the car being carried on drawn steel talolar axle ends. The differential is of the spur gear type and is carried on Timber bearings. The torque is taken upon a solid round torque rod with a forward ball end. which is held in a socket at the rear cross member of the frame. The frame is of cold pressed nickel steel with the side rails inswept at the front to allow for short turning. The frame is 4 inches longer than in 1909. Side rails and drop members of one piece channel section are strengthened at their joints by heavy gussets. The motor, clutch and transmission are carried on "drop frames," there being no sub-frame

The front axle is of heavy cold pressed nickel steel of channel section with Tmken bearings on the pivot pins and the wheel spindles.

The steering gear is of the screw and nut type with ball thrust bearings, both above and below the screw. A 17 inch hard rubber steering wheel is used, wih the spark and throttle control levers above on a stationary quadrant. There are four brakes on the rear axle, two internal and two external, with extra wide brake bands. The inner shoe is of phosphor bronze and the





REAR SPRING AND SHOCK ABSORBER.

outer bands are lined with composition. Both sets of brakes operate through equalizers. The use of semi-elliptic springs at both front and rear permits of low suspension of the body. The front springs are 42½ inches long, 2 inches wide, with eight leaves, while the rear springs are 51½ inches long and 2¼ inches wide, and have ten leaves. Each car is equipped with Winton design shock absorbers, rubber bumpers and jump straps, and there are grease cups on all shackle bolts. There are no holes through the spring leaves.

One radius rod extends from each frame rail back of the car centre to the spring seats. These rods are pivoted at both ends and work together, holding the rear axle always at right angles to the frame.

The wheels are twelve spoke artillery with 4 inch tires in front and 4½ inch in the rear, on quick detachable rims.

The dash is mahogany, with steel shield, and carries the spark coil, auxiliary gasoline tank, carburetor primer, oil sight feed, self starter gauge, push button and shut-off.

The International Harvester Company's New Model.

In addition to their regular high wheeled type of automobile the Akron, Ohio, branch of the International Harvester Company will put on the market for 1910 a four cylinder, air cooled, shaft drive model fitted with either solid or pneumatic tires. In general construction this model is conventional, but it presents some interesting details.

For the present one model only will be manufactured, fitted with a runabout body, with or without rumble seat. The chasses of both these models are the same, except for the gear reduction.

The motor is of the four cycle, four cylinder, vertical, air cooled type with the cylinders cast separately, with integral heads and cooling flanges. The combustion chamber is dome shaped, with the inlet and exhaust valves set

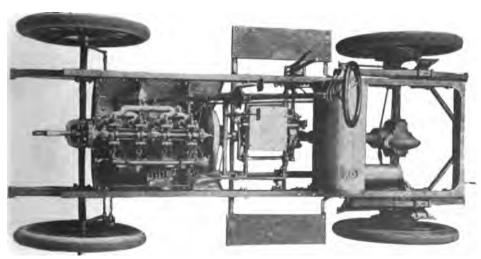
The connecting rod is an I section drop forging with a solid wrist pin end, bushed with phosphor-bronze. The wrist pin is secured in the cylinder by a set screw and cotter, thus eliminating the danger of the pin working out and scoring the cylinder walls. The crank pin end of the connecting rod is of the marine type, the cap being held in place by two studs each. Phosphor-bronze and babbitt are used for the bushing here.

The crank shaft is a drop forging, ground to size, and runs in five phosphorbronze bearings. The crank case is divided horizontally into two sections, the upper half supporting the main bearings and the lower half forming an oil reservoir. This lower section is divided into four sections for the oil, and into these oil wells the connecting rods dip, the motor depending entirely upon splash for its lubrication.



INTERNATIONAL HARVESTER FOUR CYLINDER MODEL-PNEUMATIC TIRED.

therein, opposite one another, at an angle of 30 degrees. The cylinders are bored and ground, with a bore and stroke of 3¾ inches. They are fitted with three rings each and have an oil groove turned in their lower end to aid in the even distribution of the lubricating oil over the cylinder walls.



PLAN VIEW OF INTERNATIONAL HARVESTER CHASSIS.

As shown in the side view of the motor, the valves are operated through rocker arms from the overhead cam shaft. This cam shaft runs in three roller bearings and is driven from the forward end by a silent chain from a sprocket on the forward end of the crank shaft. This chain runs in guides which prevent it from whipping, and thus reduces the wear to a minimum. The valves are adjusted through the flange connection between the cam shaft and the driving gear. As shown in the front view of the motor, the driving gear of the cam shaft is slotted with three slots, concentric with the gear centre, and is secured to the flange on the cam shaft by three studs which pass through these slots, which are about 11/2 inches long. Thus by loosening these bolts and shifting the flange the desired adjustment can be obtained. Finer individual adjustment to each valve is obtained by screws in the ends of the rocker arms.

The cooling arrangement is unusual for motors of this type, although the same principle has been extensively used on double opposed air cooled motors. Currents of air are forced directly onto the

exhaust valve pockets by two fans located on the exhaust side of the motor and driven through helical gears from a shaft parallel with the crank shaft. This shaft, which runs on ball bearings, is in turn driven by a friction pulley from the flywheel, the flywheel being beveled for this purpose, as shown. The driven pulley is held in engagement by a spring within itself. This system of cooling is said to be so efficient that the motor can be run on the block under full load for an indefinite period without overheating.

Lubrication is by splash within the crank case, the oil being individually supplied to each section of the crank case by a mechanical oiler which is driven by an eccentric from the magneto shaft, which in turn is driven by a silent chain from a sprocket on the rear end of the crank shaft.

Ignition is by batteries and magneto, the batteries being used for starting through the magneto wiring. The magneto is driven by the shaft referred to above. The carburetor is of the float feed type, with gravity feed from the tank located under the seat.

The power is transmitted through a leather faced cone clutch, through two universal joints to the change gear box located beneath the seat. The gears run on ball bearings and give two speeds forward and one reverse, being operated progressively. The final drive is by Cardan shaft to the semi-floating live rear axle. The Cardan shaft is fitted with one universal joint immediately to the rear of the change gear case, and beginning just beyond this is encased in a tube bolted to the differential casing, which acts as a torsion tube. The driving stresses are taken up by radius rods.

The rear axle is built up of semi-steel castings, the extension tubes being bolted to the differential casing. The brake spiders are cast integral with the extension tubes and the spring seats float on the axle, thus relieving the springs of driving and braking stresses. Taper roller bearings are fitted throughout.

The frame is straight, of armored wood construction, strongly braced. A subframe supports the motor and change gear box, and a steel under-pan protects the whole. The frame is supported on full elliptic springs front and rear, the rear springs, as already mentioned, being floated on the axle. These springs are 36 inches long by 1½ inches wide, of five leaves each, with forged lips to prevent them from shifting.

The front axle is an I section drop forging with integral spring seats and is fitted with taper roller bearings. Steering is through rack and pinion with the drag link behind the front axle. The steering wheel is 15 inches in diameter, of wood, over a bronze spider, and is mounted on a sharply raked column.

Braking is effected by one transmission brake of the contracting band type acting on a drum on the transmission shaft just behind the change gear box, and one set of internal expanding brakes acting on the rear wheels.

Control is by the usual spark and throttle levers located on the right hand side of the steering column, immediately below the wheel. One pedal controls the clutch and the other the transmission brake, and two hand levers at the side control the change speed gears and emergency brakes respectively.

With solid 2 inch tires the wheels are 38 inches in diameter, and with pneumatic tires the equipment is 34x3½ front and rear. The equipment consists of set of tools, five oil lamps, two gas lamps and generator. The weight complete is about 1,700 pounds.

Empire Removable Rim,

Following the trend of the times the Epire Tire Company, of Trenton, N. J., ha placed on the market a removable rim, illustrated by the two cuts herewith. So plicity of construction is one of the characteristics of this rim, which is claim



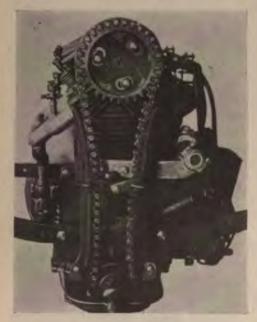
RIM IN POSITION.

to operate esaily and freely, and to be it possible to handle improperly. One of the cuts shows the rim bolted in place on the wheel. Each wheel has eight bolts, making a change only six of the bolts a loosened, the two bolts on both sides of the valve being left screwed up tightly at times. The nuts used have collars thread

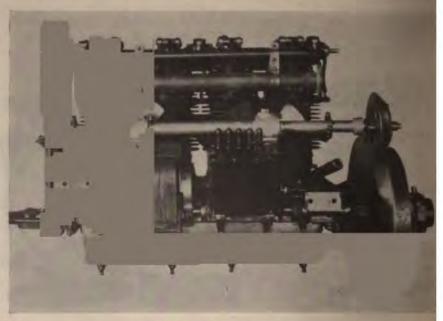


RIM LOOSENED.

on their inner sides, which makes it unnessary to remove them from the ends of bolt. It is stated that five turns of wrench loosen the nuts sufficiently to p mit of turning the lugs sideways so the rim may be removed. The other shows the nut loosened, the lug turned as and the rim partially removed.



FRONT VIEW.



Side View, Showing Fans. International Harvester Four Cylinder Motor.

Wohlfeld & Co., 538-540 North Third to Philadelphia, have placed on the set a tire trunk which is claimed to be ely waterproof. The cut herewith is the appearance of the trunk. The land back are made of three ply veand the sides are formed of heavy board. The trunk is leather bound, stitched, covered with black enameled and lined with felt throughout. It is with brass trimmings and heavy cowstraps. Among the claims made for runk are that it offers more available, that the contents are easier of ac-



WOHLFELD'S TIRE TRUNK.

than in the ordinary tire trunks, that is no hinge to break, and that the ving lid is always in place and always of the way.

#### Empire Checkered Tread.

e Empire Tire Company, of Trenton, , are exhibiting for the first time at Atlanta Show a new form of tire tread, h is to be known as their "checkered". It is of the same molded construcas used by the company during the



EMPIRE TIRE

year. The object of the checkered ruction is to give the tire non-skidding ties. A cut of the tire is shown here-

#### Foy Electric Rear Light and Number Holder.

is accessory, the general form of which own by the accompanying cut, is marby the Jordan Equipment Company, everly, Mass. It has a shell of speacquered brass, which breaks open at ottom, as shown in the cut, giving easy s for cleaning the interior silver plated tor. The lens is a standard railroad type (ruby red). The electric bulb a tungsten filament and is imported Germany. These bulbs are held in by spring cushion sockets at each no threaded connection being used,



FOY ELECTRIC REAR LIGHT AND NUMBER HOLDER.

and can be removed by simply pressing the spring at either end. A heavy ground glass runs the full length of the under part of the lamp, thus making a well diffused white light which completely illuminates the number and projects a beam of white light to the roadway, which is an added protection from rear collision. The lamp can be attached by two bolts, or it may be screwed to the back of the body or frame of the car. The switch should be located handy to the driver, so that the light can be turned on or off without leaving the seat. The number plate is slipped into the holder and is held in place by the heavy spiral springs.

Luxury Auxiliary Seats.

Graves & Congdon Company, Amesbury, Mass., manufacture a patented auxiliary seat for automobiles, motor boats, etc. The seat is attached by a dove-tailed socket secured to the side of the car, so that it can be put in place and removed instantly, without the use of tools. The seat rotates freely on its own bracket, so that its occupant can move about in a half circle with ease. The seats are hinged to the back, and when not in use can be folded against the back. These seats are made in two different styles, and each style in two sizes. The style A scat has a full upholstered back. extending from the seat to the height of the shoulders, while the style B seat is pro-



vided with a back cushion secured to upright metal rods. The two sizes are known as full and medium, respectively.

H. H. Franklin Manufacturing Company are erecting a 150x30 feet shed at their factory in Syracuse, intended for the storage of chasses awaiting the completion of their bodies. Improvements in Gabriel Horns.

The Gabriel Horn Manufacturing Company will continue to manufacture their Nos. 2, 3 and 4 horns, but in the 1910 models the two lower notes will be operated together, making a perfect chord, while the high note, which is two octaves higher than the bass chord, gives the effect of a soprano voice with a quartet. This change in combination is claimed to produce a singularly sweet, musical effect, and to give greater carrying power than any signal they have yet built. Sizes and weights of the different horns are as follows: No. 2 horn, 21/2 inch tube, 30 inches long, weight 4 pounds; No. 3 horn, 3 inch tube, 32 inches long, weight 51/2 pounds; No. 4 horn, 31/2



inch tube, 34 inches long, weight 61/2 pounds.

The 1910 valve is the same as the 1909 model, except that the lever is made from three-eighth inch material, and the screws which fasten the discs thereto are placed near the edge in such a manner that it practically forms one piece and greatly increases the strength of the lever. The valves are made in sizes from three-quarters to 3 inches for steel tubing, and from 1 inch to 2 inches for iron pipe. This valve can be used for muffler cut-out purposes by removing the disc in the main channel.

The Gabriel trumpet is another novelty which this company has recently placed on



the market, and which has already become popular. It consists of four single tubes, with a small valve at the end of each tube, which controls the tube individually. The trumpet is operated by a keyboard, consisting of four keys, each controlling one of the notes. All conbinations of trumpet and bugle calls can be played. The keyboard is also fitted with a small lever, which opens the four valves at the same time, thereby producing a perfect chord for signal purposes by simply pressing the pedal.

#### General Motors Absorb Cartercar Company.

The General Motors Company have absorbed the Cartercar Company, a \$350,000 corporation, of Pontiac, Mich. It is stated that the business was turned over to the new owners for a part cash and part stock consideration. The Cartercar Company was originally located in Detroit, but about a year ago was consolidated with the Pontiac Spring and Wagon Company, and was then removed to Pontiac. It manufactures a friction drive car.

# COMMENTS AND QUERIES OF READERS.

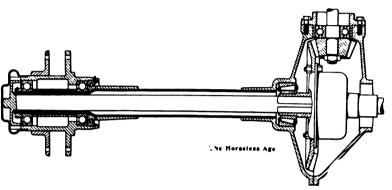
#### Queries.

Editor Horseless Age:

As an enthusiastic reader of your paper I will ask you to answer for me the following questions:

1. What is the difference between a se-

drive are live axles. A live axle usually consists of two essential parts, viz., the interior driving shafts and the exterior housing or casing. The floating axle is a live axle in which the tubular portions of the rear axle housing extend entirely



FULL FLOATING AXLE

lective and a progressive transmission?

- 2. What is a floating rear axle?
- 3. What is a semi-floating rear axle?
- 4. What is a live axle? A. E. P.

[In the progressive type of change gear you obtain the different forward speeds and also the reverse successively by a continuous forward or backward pivotal motion of the change gear lever. With a selective type of change gear, the gear lever has both a pivotal motion in a forward and backward direction, and a sliding (or pivotal) motion in a direction crosswise of the car. The progressive type of change gear generally has a single sliding set of gear pinions, while the selective type of gear usually has two independent sliding sets, and the object of the sideward motion of the gear lever in this latter type of gear is to drop one of the sliding sets and pick up the other.

To explain the different constructions of rear axles it is probably best to begin with a live axle. A live rear axle is one through which the power is transmitted to the driving wheels. The rear axles of all cars except those with side chain or side gear

through the rear wheel hubs, and the rear wheels turn on bearings on the outside of the tubes. All the weight on the rear wheels is then carried by the tubular axle housings, and the rear axle shafts are used only for transmitting the power to the rear at the inner ends of the axle shaft is the same as in a floating axle; that is, the bearings are mounted on the hubs of the differential, and not on the axle shaft directly. At the outer ends of the axle shafts of a semi-floating axle the arrangement of the bearings is, however, the same as in an ordinary live axle. The tubular axle housing in such an axle extends only to the inner ends of the rear wheel hubs. There is a bearing for the driving shaft just inside the outer ends of these housings, and the hubs of the rear wheels are keyed to the outer projecting portions of the axle shafts.—Ed.]

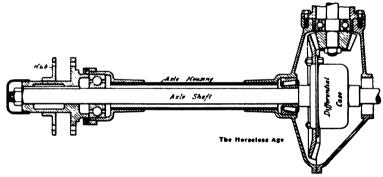
# Upward Thrust on Piston During Suction Stroke.

Editor Horseless Age:

Will you please tell me what a "flying" piston is and why its use is impracticable? Also what is the maximum upward thrust on a 5 inch piston during suction stroke of an engine running about 800 r. p. m.?

H. F. B.

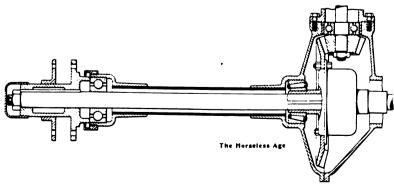
[We regret to be unable to inform you what is meant by a "flying" piston. The



ORDINARY LIVE ANLE.

wheels. The bearings on the inner ends of the shafts of a floating axle are also on the hubs of the differential gear and not on the axle directly. In a semi-floating axle the arrangement of the bearings term is probbaly used by some inventor to designate a special construction. If any reader can shed any light on the subject we shall be glad to hear from him.

The upward thrust on a 5 inch piston during the suction stroke depends (1) upon the suction or degree of vacuum in the cylinder, which in turn depends upon the cross section, length and general conformation of the inlet passages, and (2) upon the weight of the reciprocating masses. The first factor is beyond calculation. We may illustrate the calculation of the thrust on the piston, due to inertia, by assuming the weight of the reciprocating parts (piston, wrist pin and part of connecting rod) to be 10 pounds, and the connecting rod to be twice the length of the stroke, which latter we will assume to be 5 inches. The acceleration of the piston is a maximum when the crank passes through the top dead



SEMI-FLOATING AXLE.

centre (in a vertical engine). The acceleration at that moment is represented by the following formula:

$$a = \omega^2 r \left( 1 + \frac{r}{l} \right)$$

where w is the angular velocity in radians per second, r the length of the crank radius in feet, and I the length of the connecting rod in feet. Substituting in this equation the values which we have assumed.

$$a = \left(\frac{800 \times 6.28}{60}\right)^2 \times \frac{2^{\frac{1}{2}}}{12} - \left(1 + \frac{1}{4}\right)$$
= 1.847 feet per second per second.

The formula for inertia forces is

$$\mathbf{F} = \frac{a}{\mathbf{g}} \mathbf{W},$$

where a is the acceleration in feet per second per second, g the acceleration due to gravity (32.2 feet), and W the weight of the accelerated mass. Substituting in this formula we have

$$F = \frac{1,847}{32.2} \text{ ro} = 507 \text{ pounds.}$$
This is the maximum force due to ac-

celeration of the reciprocating parts. The force dut to the suction will hardly ever be greater than 3 pounds per square inch, considering the moderate piston speed. At the beginning of the stroke the suction force is nil, and it increases very gradually, owing to the fact that there is a considerable volume of spent gas in the cylinder at the beginning of the stroke. The inertia force, on the other hand, is a maximum at the beginning of the stroke and becomes zero before the stroke is half completed. In connection with it the suction force is practically negligible, and there is no doubt that the inertia force at the beginning of the stroke, as above calculated, constitutes the maximum upward thrust on the piston.-

#### Suitable Sizes of Electric Vehicle Lamps.

Editor Horseless Age:

On account of its greater convenience and cleanliness I am thinking of using dynamo and storage battery for lighting my lamps, including headlights. What candle power electric lamps should I use to replace the 34 foot burners on acetylene lamps, and what is the usual power of side oil lamps? What size storage battery would you recommend, and how long would it light all five lights with the dynamo running? S.

[A 3/4 foot acetylene burner gives 37 candle power, but it is advisable to get along with a somewhat less powerful lamp if you wish to use electricity. The headlights should be of 10 to 20 candle power, and for the side lights 2 to 4 candle power is sufficient, and the rear light need only be 2 candle power. These lamps consume about I watt per candle power, hence when all lamps are burning the electric energy consumption would be about 26 watts if the smaller sizes of lamps are used and 50 watts if the largest lamps are used. The output of the dynamo is very probably

greater than this, so with the dynamo running the lamps should burn indefinitely, no matter what size battery you use. A 6 volt 50 ampere hour battery should be ample, as it will be drawn upon only when the car is stationary or the engine running very slow. Without the dynamo running this battery, when fully charged, should run all five lamps (the largest size mentioned) for six hours.—ED.]

#### Rotary Motors.

Editor Horseless Age:

I notice a statement that the French rotary gasoline motor built for aeroplane use has been scrapped and replaced by a standard motor. A large amount of money was spent in experiments with this motor, and apparently the problem of gasoline supply to cylinders from the inner and not from the outer ends (against centrifugal force) was satisfactorily solved.

Specific oil consumption, 0.184 kg. (= 0.405 lb.) per horse power hour.

Features of Motor-

Number of cylinders, seven.

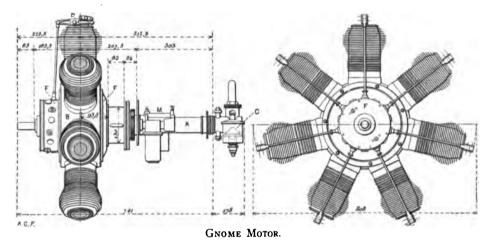
Cylinder bore, 110 mm. (= 4.4 inches).

Piston stroke, 120 mm. (= 4.8 inches).

Fuel supply, spraying carburetor. Ignition, high tension magneto.

Cooling, by displacement of air by the motor

The crank shaft of the Gnome motor is fixed and the seven radial cylinders turn around it. The shaft is hollow and comprises a crank pin, which is also fixed in space, which carries two ball bearings supporting a master connecting rod. This rod connects to one of the pistons. The other pistons connect to small connecting rods pivoted to the master connecting rod. The outer ends of the connecting rods are attached to hubs which are fixed to the piston and secured by the inlet valve boxes, which serve as check nuts. The seven cylinders are made of nickel steel and are "worked from



C, carburetor; F, valve gear housing; B, cylindrical portion of crank case; A, hollow shaft; M, magneto; C, exhaust tappet lever.

Could you inform those of your readers like myself interested in hitherto unsolved problems of rotary motors why this French rotary is a failure, and give some diagram of its construction?

[This motor, which was used by Henry Farman during the Rheims week and later, has probably been discarded by him, if you have heard such a report. It can hardly have been discarded by the manufacturers, as they exhibited it at the Paris Aeronautical Show only last month.

The motor was entered in the contest of light flying machine motors of the A. C. of France, and from the report on this contest we take the following description and test results:

RESULTS OF TEST OF GNOME MOTOR.

Average speed for 15 minutes, 1,177 rev. p. m. Average power for 15 minutes, 34.2 h. p. Total fuel consumption in kg. per hour, 12.26. Average oil consumption in kg. per hour, 6.29. Weight of motor and accessories, 82 kg. (= 180 lbs.).

Weight of fuel and supplies consumed per hour, 100.57 kg. (= 221 lbs.).

Specific weight, 2.94 kg. (= 6.47 lbs.) per horse power.

Specific weight of motor alone, 2.19 kg. (= 5.26 lbs.) per horse power.

Specific fuel consumption, 0.359 kg. (= 0.79 lb.) per horse power hour.

the solid." The exhaust valve is located in the centre of the cylinder head.

The crank chamber consists of a cylindrical box, with separate end plates, of which one constitutes a thrust plate and the other a cam gear casing. The cylindrical portion of the casing is provided with seven openings, into which the cylinder ends are forced under pressure, and held in place by steel segments and clamps parallel to the centre line of the crank case. The centrifugal force has the effect of squeezing the segments between the inner and outer walls of the joint. All parts of the crank chamber are also of nickel steel. The end thrust plate is provided with ball bearings, and these act in both directions, which permits of fixing to the plate a propeller which exerts either a push or a pull on the motor. The cam gear casing contains the forward ball bearing as well as the cam gears.

The inlet valves are of the automatic type, and are located in the piston heads. The gaseous mixture is first drawn into the crank chamber, as we shall see further on. The exhaust valves are balanced by means of a system of counterweights, in order that their operation may not be influenced by centrifugal force. Inside the cam gear housing are placed the half time gears and

Total

Distance

Day's

Mileson

the seven cams, which effect the opening of the exhaust valve by a pulling action. A double rocking lever, provided with balance weights designed to avoid unnecessary strain on the cams due to the action of centrifugal force on the valves, opens the exhaust valve. The exhaust vales are closed by a spring, and the balance weights are so calculated that in case one of the springs breaks the centrifugal force on the valve is still sufficient to close it, so the cylinder affected will still keep operating.

The carburetor is of the spraying type. It is provided with a supplementary air valve and with a float chamber. It is placed at the end of the hollow crank shaft. The suction in the crank chamber, due to the in and out motion of the pistons, draws the combustible mixture into this chamber, through the carburetor and the hollow crank shaft.

The high tension magneto is driven from the crank shaft in the ratio of 7 to 4. It furnishes current to a high tension distributor of hard rubber with seven contact segments. The spark plugs have been specially designed to be able to withstand the centrifugal force.

The cylinders are provided with circumferential cooling flanges. No fan is used, sufficient cooling effect being produced by the motion of the cylinders through the air. Oil leads passing through the hollow shaft of the motor supply oil to the connecting rods and bearings, and from there it passes through oil channels to the cylinder walls. The oil pump is placed symmetrically with respect to the magneto, and is of the two cylinder type with distributor.—ED.]

# Automobile Assessed Separately. Editor Horseless Age:

As a resident of a borough in the State of New Jersey I write to ask you if you would inform me whether it is according to the law for such a borough to render a separate tax bill based upon an assessment of an automobile? I was under the impression that the State alone could impose such a tax, while a borough might—as many do—impose such a tax by including same in the personal property assessment.

#### SUBSCRIBER.

[The borough can collect a tax on the automobile as personal property, and there is nothing in the laws of your State which prevents the tax collector from sending you several bills, each for a part of your personal property. You should inquire whether or not the tax is a personal property tax. If it is, you will probably have to pay it.—Ed.]

### Part of the Equipment Missing. Editor Horseless Age:

A new owner had just received his car from the factory and was carefully checking off the equipment received against the list in the catalogue. Only one thing enumerated in the catalogue was missing, so he wired the factory: "Cannot find wheel base; send it at once by express."

E. T. BIRDSALL.

# Records of Operation of a Coal Truck.

Editor HORSELESS AGE:

Date

As your publication is interested in the progress of the motor truck, I take this opportunity of forwarding you data on half a month's work of our 10 ton truck, about which the public knows very little.

The data speak for themselves, and it is evident that the large unit is the most economical wherever it can be put into practice. Burns Brothers have put in a special chute in their coal yard, with which they load the truck in a minute and a half. This greatly helps the output.

The car does not show any abnormal wear, and there have been no breakages or serious deterioration of parts

When a car is able to deliver 4,000,000 pounds of coal a month, or 50,000,000

Gas,

Callons

pounds a year, at half the cost of delivering with horses, the automobile has certainly come to stay.

HEWITT MOTOR COMPANY,
Edward R. Hewitt. President.

#### "Graphite or Talc?"

Editor Horseless Age:

In a communication to THE HORSELESS AGE of October 27 William Hinds mentions the use of flake graphite instead of talc to prevent inner tubes from adhering to the covers. I removed an inner tube yesterday which adhered so tightly to the cover that it required a great deal of care and time and a free use of gasoline to separate it without serious damage. I think every autoist has had similar experiences with tires that have been run several thousand miles before being punctured, even

### TRUCK OWNED BY BURNS BROTHERS. FOURTH MONTH OF OPERATION.

Tires in excellent condition; will certainly go eight months and probably more. No delays, no loads missed in four months. Car in excellent condition.

#### Base—Thirty-eighth street and North River. Loads—Average weight, 20,250 pounds.

Address

Date	:.	Loads.	Gallons,		leage.	Distance.
October	13	1	12	81st street and Columbus avenue	37.0	5.5
	13	2		8oth street and West End avenue		10.0
	13	1		23d street and 6th avenue		3-5
	13	4		18th street and 6th avenue		18.0
	14	1	8	81st street and West End avenue	37.0	5 - 5
	14	7		18th street and 6th avenue		31.5
	15	1	10	81st street and West End avenue	38.o	5.5
	15	I		81st street and Columbus avenue		5.5
	15	6		18th street and 6th avenue		27.0
	16	5	12	18th street and 6th avenue 34	1.0	22.5
	16	I		81st street and Columbus avenue		5 - 5
	16	1		44th street and 6th avenue		3.0
	16	I		44th street and 6th avenue		3.0
	18	T	12	81st street and West End avenue 3	36.5	5.5
	18	1		73d street and West End avenue		4.0
	18	6		18th street and 6th avenue		27.0
	19	2	15	56th street and 7th avenue 3	36.5	7.0
	19	3	-	18th street and 6th avenue	-	13.5
	19	4		22d street and 6th avenue		16.0
	20	1	11	81st street and West End avenue	33 5	5.5
	20	3		57th street and 7th avenue		10.5
	20	ı		22d street and 6th avenue		4.0
	20	3		18th street and 6th avenue		13.5
	21	8	10	57th street and 6th avenue	34.6	32.0
	21	1		43d street and 6th avenue		2.6
	22	9	12		10.0	40.0
	23	8	17		33-5	28.0
	23	1		81st street and West End avenue	J <b>J</b> - J	5 - 5
	25	1	10		37.0	5.5
	25	7		18th street and 6th avenue		31.5
	26	3	14		37.8	13.5
	26	3	•••	71st street and Central Park West	,,	13.8
	26	1		81st street and Columbus avenue		5.5
	26	I		70th street and Amsterdam avenue		5.0
	27	1	12		34 - 3	5.0
	27	1		43d street and 8th avenue	34.3	2.0
	27	3		71st street and 8th avenue		13.8
	27	3		18th street and 6th avenue		13.5
A		-				
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				• • • • • • • • • • • • • • • • • • • •		20,250
				••••••		33,250
						23,125
Average	ton n	niles per i	gallon of g	asoline	• • •	34 - 43

h French chalk was freely used when ires were put on. It would be very ying to find something more satisty than tale or French chalk. I wish Hinds would tell us if he shakes the lite into the cover in the same way we ale, or if he rubs a polished coating the cover and tube, leaving no free lite. Also if he finds that graphite omes the tendency of the tube to adto its cover.

it known whether graphite injures the

nat do the tire manufacturers say about

#### bined Demountable and Detachable Flange Rims.

r Horseless Age:

there on the market a demountable rim the quick detachable flange feature? demountable rims having the standard her flange I am acquainted with; also lisk type demountable rim. If the detable rim can be had with the quick hable flange feature it is what I de-O. C.

he Fisk Tire Company manufacture a untable rim for use with their bolted re. The Firestone Tire and Rubber bany, of Akron, Ohio, and the Doolitim Company, of New York, make detable rims comprising detachable rim es.—Ep.]

# ants to Fit Detachable Rims.

have an automobile with ordinary her rims, size 3x30, to which I wish to oodyear detachable rims. I am only an eur machinist and have never seen a of that kind done, and I would like to about what I am going to run up st before I undertake the job. Will it ecessary to do any cutting or welding e rim in order to make it fit? Will new rim have to be heated in order to nd it so that it will go on the wheel and contract on cooling, the same as the tires on a horse drawn carriage are or can they be simply driven on and a good fit? Please give me all the mation that you can as to how to do job, and you will certainly confer a favor on one of your subscribers.

H. S. FLOYD.

he rims are heated and shrunk on the as a carriage tire, and are then rivin place. Any wheelwright can do the , and if you know how carriage tires et you should have no difficulty in fitthe rims.—Ep.]

ty commercial vehicles started on the stage of the commercial vehicle trials in A. C. of France, from Versailles, on the trials, three less than had been the din. The contest will continue until middle of November, with Versailles as not a complete rated report toward the end of this th.

#### Fiat World Speed Record Holder in Atlanta Events.

The Fiat Automobile Company, of this city, have brought to this country for competition in the speedway races at Atlanta this week the 175 horse power Fiat with which Nazzaro made the world's record of 121.64 miles an hour at Brooklands track, England, the fastest time ever recorded for a gasoline car on any course. This record was made on June 8, 1908, in the memorable match between Nazzaro and Newton, which Nazzaro won, and which was officially timed by the timing committee of the Brooklands Automobile Racing Club with an electric timing and recording device.

The record was a big improvement over the previous "2 mile a minute" made by Demogeot at Ormond, Fla., for the latter was over a straightaway course, while Nazzaro's performance was on a 2 mile track. The Fiat's time beat Demogeot's by a goodly margin, actually covering 2 miles 144 feet in one minute. In the straight stretches of the oval Nazzaro, of course, even exceeded this terrific speed, but was timed only for full laps.

This big car, which was recently purchased by E. W. C. Arnold, the New York motor enthusiast, is being driven at Atlanta by Lewis Strang. Since the car made its great record at Brooklands many efforts have been made to bring it to this country. While it is a specially built racer, there is absolutely nothing freakish in its design, and it is constructed along the general lines of the regular large Fiat models.

It possesses a huge motor, with four cylinders cast in pairs. The bore is 190 mm. (7.48 inches) and the stroke 160 mm. (6.29 inches). The single cam shaft is located on the off side of the engine within the crank chamber, and is driven by the exposed timing gears. The cam shaft carries a second and smaller very thin spur wheel to drive the low tension magneto. Inlet and exhaust valves are placed overhead. The inlet valves are operated by long tappet rods and rocker arms. The inlet valves are about 3½ inches in diameter. The exhaust valves are on the opposite side;

also operated by tappet rods and rocker arms, and there are eight valves, two to each cylinder, which are placed side by side and proportionately as large as the inlets. When the exhaust tappet rods are at their lowest points the respective arms clear the cross rod, which supports the inlet valve rockers by only little more than the thickness of thin cardboard, which reflects the endeavor of the designers to utilize the available space to the best advantage.

#### Results of Salina Endurance Contest.

In the recently held Salina, Kan., endurance contest the first prize in the dealers' class, \$50, was awarded to the Maxwell roadster No. 5, driven by S. C. Bragg, which was the only car in its class to finish with a perfect score. The silver cup offered in the class for private owners was awarded to F. S. Gilman, of New Cambria, driver of Franklin No. 11, which also was the only car to finish perfect in its class.

#### Imports for October.

At the port of New York there were imported during the month of October by dealers 53 new pleasure cars (including 14 Fiats, 11 Lancias, 6 Delaunay-Bellevilles, 5 Renaults, 5 Benz, etc.), 42 taxicabs (including 25 De Dions and 10 Fiats), and 1 truck; and by owners 102 old cars, of which 70 were of domestic manufacture and 29 new cars.

#### Strang's Fiat Did Not Break Steering Knuckle.

We are informed that the Fiat car, No. 1, driven by Lewis Strang, in the Vanderbilt Cup race, did not break its steering knuckle, as stated in our report, but that the sole cause of its withdrawal was the damage to its radiator caused by a flying stone. The radiator would no longer hold water, and it was necessary to withdraw the car after the first lap.



LEWIS STRANG AT WHEEL OF THE ONE HUNDRED AND SEVENTY-FIVE HORSE POWER FIAT RACER.

### THE FIELD OF COMMERCIAL APPLICATIONS.

#### Taxicab Service in Atlanta, Ga.

The Atlanta Taxicab Company was incorporated under the laws of Georgia in November, 1908, and began operations in Atlanta on March I, 1909. Its garage and offices are located together at 112 East Ellis street, Atlanta, in a two story brick and concrete building erected especially for its use. The building has 52 feet front by 137 feet depth, with a yard in the rear in which are the lubricating oil storage and the machine shop and pit in an annex to the garage.

The Sultan taxicab is operated by this company, made by the Sultan Motor Company, of Springfield, Mass. The cars used are 26-28 horse power, or 14 French rating.

Sixteen cars are now in operation. The manager of the company states that the company expects to keep on adding to the number of cars in operation until about twenty-five are on the streets, making the additions to its service as it finds the traffic offers demand. The company has estimated that Atlanta is a twenty-five taxicab city.

All of the company's business is done from four private stands located at the two depots of the city, at its principal hotel and its principal club. One of its stands is in front of Durand's restaurant in the Union Depot. Another is in front of Jacob's branch pharmacy facing the plaza of the Terminal Station. A third is alongside the Capital City Club, at Ellis and Peachtree streets. The fourth is across Luckie street from the main entranec of the Piedmont Hotel. These are held to cover strategic points of the city from the company's standpoint.

In this connection the company has insti-

tuted an innovation in its service-a private telephone system that connects directly with the starter's board at the garage from any one of the four private stands. At the Piedmont Hotel stand, across from the hotel, in the little office that the company rents, is one of the telephones, which any patron may ring and secure direct connection with the starter, if there be no cab on the stand at that moment. At the three other stations are call boxes of iron on iron posts at the curbing, very much in appearance like police call boxes or fire alarm boxes. These are open, too, to the service of the public. A prospective patron opens any one of the boxes and secures direct connection with the starter, if there is no cab on that particular stand; and the starter, consulting his board, sends the nearest cah to the stand.

By means, also, of this private telephone system the starter is enabled to keep check on the cabs themselves. A driver, leaving a station, reports his time and whether there is another cab on that station. If there be no cab there, and one is available on another station, the starter rings up the other station and orders one of the cabs to cover the bare station. The driver reports when he reaches the bare station, and his name goes up on the board for that point.

Every call over both the Atlanta and Bell telephone systems comes to the starter's telephone, in addition to those which come over the private system. If the call comes over the public telephone the starter sends a cab from the nearest station, making the necessary moves of the name slips on his board. One starter is in a position by this

method to keep all the stands covered and to render immediate service.

The Atlanta Taxicab Company uses pneumatic tires. Stepney spare wheels are used solely.

The rates are as follows: By distance, first half mile or fraction, 30 cents; each quarter mile thereafter, 10 cents; waiting. each six minutes, 10 cents; extra charges. for ordering a cab to a point 11/2 miles or more from the centre of the city, 20 cents; returning charge, when dismissed 1½ miles or more from the centre of the city, 20 cents. The same rates apply both night and day. They are for the exclusive use of the cab. One, two, three or four passengers will be carried on one charge. Not more than four passengers are allowed. If the cab is disabled the service up to the disablement must be paid for. A cab ordered and not used must be paid for up to the time the driver is dismissed, including charge of 20 cents for sending it. Coupon books at a discount of 5 per cent, are on sale at the main office and the stands. Large baggage cannot be carried.

The company gives no special private service at monthly rates. Service is given at flat rates of \$4 for the first hour and \$3 for each hour after that.

Popp taximeters are used, made by the Franco-American Taximeter Company. They are driven from the left rear wheels of the cabs.

All of the necessary repairs on the cars are made in the shops of the company at its garage. There is no maintenance contract with tire manufacturers. A tire record is kept, however—a daily record of the mile-

#### TAXICAB OPERATING COMPANY No. 948. Gasoline Supplied......Gals. Driver No..... Gasoline, In..... Gals. Oil Supplied......Pts. Date...... Gasoline Used......Gals. Taxicab No..... MILEAGE Starting Pinishing Time Hotel Call TRIP FROM TO Amount Collected Time Time Waiting Yes or No Finish 2 24 Half Not Record-ing Time ing Time Charges Extras SUMMARY OF CHARGES. DUE FROM DRIVER. IN Charges at 10c COMMISSION OUT Charges at 30c Extras at 20c. IN OUT TOTAL Paid to Driver

age made on each casing. This record is carried forward until the casing has to be taken off for repair or replacement. The company is supposed to get 3,500 miles on each casing. If the casing fails before that a replacement is allowed to the company. But the casings have been giving nearly 4,000 miles of service.

The daily mileage of each cab is reported as about 40 miles. The company's operators are paid 20 per cent. of their earnings. Lubricating oil is furnished free to the operators. Gasoline also is furnished free of charge until the driver makes \$12 on the week's work, when it is charged to him at cost price in the following proportions: \$12 earned, but less than \$14, one-third; \$14 earned, but less than \$16, two-thirds; \$16 or more earned, the whole cost.

The operating company leases the cabs owned by the taxicab company, paying the taxicab company 75 per cent. of the net profits.

The busiest hours of service have been found thus far to be as follows: In summer

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10c			1
Extras			
TOTAL		myada ay	5
			5

on week days, between 10 o'clock and noon, between 2 o'clock and 5 p. m., and between 7:30 o'clock and 11 p. m. In winter on week days, between 1 o'clock and 4:30 p. m., between 6:45 o'clock and 9 p. m., and between 10:30 and 2 a. m. On Sundays the busy hours stretch from 2 o'clock in the afternoon practically through to midnight.

There are no specific ordinances regulating the taxicab service in Atlanta. The taxicabs are operated under ordinary hack rules.

In addition to the private telephone and call box system, the Atlanta Taxicab Company has another feature that is original—its dormitory for the drivers on late runs. This dormitory, or sleeping quarters, is provided on the second floor of the garage and office building. It is equipped with beds, closets and bathrooms.

Only two printed forms are in use in the company's offices. When the company began operations last March it had secured a number of printed forms from other companies. The management picked out what it considered the best features of the forms it needed, and embodied those features into tentative forms that are still tentative. Only two forms have become definite enough to

be printed. The company has put in a card index system. It pays its drivers weekly. The company is running separate record systems on casings, gasoline and spare parts. Gasoline used is charged to the drivers each day, in the quantity used on the preceding day.

#### Motor Mail Service in Columbus, Ohio.

The post office at Columbus has been authorized to establish an automobile collection service, beginning January 1. Postmaster H. W. Krumm has been in communication with the Post Office Department at Washington for several months, with the result that his request was granted. It is expected that with three automobiles and six collectors, a night and a day shift, the collection service can be much improved over the present system, with eleven wagons and eleven collectors. The cars will be rented from local garages, and chauffeurs will be supplied by the parties renting the cars. They will be of the same style as the horse drawn delivery wagon, with screened sides and rear entrance.

#### Motor Bread Delivery.

Charles A. Grosch, a baker, of Piqua, Ohio, is probably one of the first bakers in the country to introduce the motor delivery. He uses a 16 horse power 1906 model Franklin car. A set of Swiss bells carried under the top extension over the driver's seat announces the arrival of the bread wagon. The rear of the car platform is enclosed, providing a series of receptacles capable of holding 550 loaves of bread, and above the hood is a box 14 inches deep for storing additional bread. Mr. Grosch states that he saves two hours each day by the use of the motor car.

#### Commercial Notes.

The Baldwin Locomotive Works, Philadelphia, have put into commission a 3 ton motor truck for service between their works in Philadelphia and their foundries and branch works some 13 miles away.

An automobile line from Earlington to Pioneer place, Seattle, is to be established at once by C. D. Hillman, a real estate dealer of Seattle. Six automobiles of the sightseeing type will run hourly between the two points.

The Union Trust Company, of Indianapolis, has purchased a touring car, to be used in showing real estate to prospective purchasers. A number of real estate dealers of the city are using automobiles with excellent and economical results.

The Warfield-Pratt-Howell Company, of Cedar Rapids, Ia., have placed in service a motor delivery wagon, equipped with a 25 horse power engine and designed for a carrying capacity of 3 tons, which was built by a local firm, Beck & Son. It is the first of its kind and was placed in service tentatively.

William Holden, an enterprising rural mail carrier at Sparta, Wis., is now making his route in an automobile. In this way he saves 50 per cent. of time.

The Acme White Lead and Color Works, of Detroit, Mich., who put a power wagon in service a year ago, have added another machine of the same make, the Grabowsky.

We are informed that the Brazilian Government has just placed an order for fifty Saurer trucks. These trucks will be shipped direct from Switzerland from the Saurer factory to Brazil.

A motor sprinkling truck may be purchased by the city of Two Rivers, Wis. The city now maintains five horse drawn carts and hires five drivers. While the initial cost of a truck would be comparatively heavy, all of the carts could be discarded, and the saving, it is said, would pay for the truck in one season.

#### Windsor White a Licensed Association Representative.

The Association of Licensed Automobile Manufacturers held its annual meeting at 7 East Forty-second street, New York, on Thursday of last week, at which the following officers were elected for the ensuing year: Charles Clifton, president; S. T. Davis, Jr., vice president; L. H. Kittredge, secretary; Col. George Pope, treasurer. The executive committee will consist of Charles Clifton, S. T. Davis, Jr., Thomas Henderson, Hugh Chalmers and Herbert Lloyd. The Waltham Manufacturing Company, a former member of the licensed association, which went out of business about a year ago, was represented by Windsor T. White, of the White Company, Cleveland, Ohio, from which it is inferred that the latter company has acquired or is about to acquire the license of the Waltham Company. Among the new members of the association, the Dayton Motor Car Company was represented at the meeting by C. G. Stoddard, the Hudson Motor Car Company by R. B. Jackson, the Jackson Motor Car Company by G. A. Matthews, the Maxwell-Briscoe Motor Company by Benjamin Briscoe, the Olds Motor Works by C. R. Hathaway, the Reo Motor Car Company by R. E. Olds and the Toledo Motor Company by J. N. Willys.

#### R. M. Owen Issues a Challenge.

R. M. Owen, who drove one of the new four cylinder Reo roadsters in the New York-Atlanta tour and finished with a perfect score, upon his arrival in Atlanta issued a challenge to the effect that all of the competing cars immediately after being checked out at Atlanta should be submitted to a technical committee, composed of Referee Winthrop E. Scarritt and the officials who checked and examined the cars at the start, for a critical and exhaustive examination under rules determined by the committee. Mr. Owen offered to pay all expenses of the examination. The findings of the committee were to be final.

### AUTOMOBILE LAW AND LEGAL EVENTS.

#### Recent Decisions.

DUTY OF STREET CAR PASSENGERS WHEN ALIGHTING.

A street car passenger in alighting was held required to look for approaching vehicles when she stepped from the car to the street, and the failure to look rendered her guilty of contributory negligence.—Kauffman vs. Nelson, Pa. 73 Atl., 1105.

In this case she did not look until after she had taken several steps from the car. When she saw the automobile she hesitated, and the auto turned to the curb to avoid her and she stepped in front of it.

FAILURE TO CHECK SPEED MAKES DRIVER LIABLE.

Where a pedestrian and the driver of an automobile became confused and zigzagged across the street, and finally the pedestrian was hurt, it was held that the failure of the defendant to check the speed of his machine, or to stop it if necessary, rendered him liable for damages.—Weil vs. Kreutzer. Ky. 121 S. W., 471.

#### REPLEVIN FOR AN AUTOMOBILE.

In an action of replevin for an automobile where the defendant alleged that the contract for the sale was in writing between the plaintiff and another partly jointly and the defendant, it was held that such other person was a necessary party to the action—Swenson vs. Wells, Wis. 122 N. W., 724.

# Jeffery Is Granted Big Damages. Against Railway Company.

A verdict of \$133,000 damages was granted Thomas B. Jeffery & Co., of Kenosha, Wis., against the Chicago & Milwaukee Electric Railway Company at the conclusion of the second trial of the suit resulting from the division of the Jeffery tract by the electric's right-of-way, making contemplated extensions of the Rambler works impracticable. The Jeffery company sued for \$2,000,000 damages and in the first trial was granted \$135,000. The Supreme Court called the amount excessive and ordered a new trial.

#### Chicago Police Innovations.

The first experiment in patroling the streets in certain parts of the city of Chicago by a motorcycle squad began last week. At first the squad will consist of only three policemen, but if the innovation proves a success, Chief of Police Steward will increase their number. The present plan is to experiment with them in the messenger service, and instead of the police mail being brought to headquarters by policemen by way of the street cars the motorcycle squad will deliver it. Chief of Police Steward of Chicago is planning to leave cards with the owners of automobiles which stand at the curbs in downtown streets rotifying them that the city ordinance limits the time that a vehicle may linger in one spot to one hour. The cars will be distributed through the agency of the mounted police.

#### Rush for Ohio Licenses.

A check for \$100 from the Winton Automobile Company, of Cleveland, is the largest fee ever received by the Ohio automobile department. The fee was for licenses for the factory for the year 1910. The company desires to retain the same numbers, and the request was granted. There is a rush for owners to get the same numbers they had during 1910, and in many cases State Registrar of Automobiles Fred H. Caley is complying with the request, especially when a good reason is given. The registrar anticipates quite a rush during December and January, and the force of clerks will be more than doubled.

# Supplementary Spiral Spring Patent Interference Decided.

We are informed that the United States Patent Office on October 30, in the interference case entitled Graham vs. Furmidge, involving an application for patent filed by John Hector Graham on December 19, 1907, and the Furmidge patent, No. 807,612, assigned to the St. Louis Supplemental Spiral Spring Company, Inc., rendered a decision in favor of the latter. The St. Louis Supplementary Spiral Spring Company have filed suit in the United States Circuit Court at New York city against John Hector Graham and the Graham Company, doing business under the name Supplementary Spiral Spring Company, New York city, alleging infringement of their patents Nos. 807,612 and 901,578.

# Petitions for Return of Deposit Money.

W. W. Alexander, a New Mexico business man, has filed a petition with Judge H. C. Briggs, referee in bankruptcy for J. V. Lindsley & Co., of Dowagiac, Mich., for the return of the sum of \$1,000 which he claims to have deposited with the firm in connection with the purchase of two cars. Mr. Alexander claims that this sum was a trust fund, and should be returned in full, while counsel for the Lindsley Estate contends that Alexander made the payment in consideration of being taken into business partnership, receiving the exclusive agency for the Lindsley cars in the Southwest.

#### Warning Motorists of Speed Traps Illegal in England.

For many years the Automobile Association of England has been trying to break up the practice of the English police to apprehend speeding motorists by the operation of so called speed traps. As soon as

such a trap was established the association would place cycle scouts on the road to warn all approaching motorists. When accused in court of interfering with the police the officials of the association made the plea that what they were really endeavoring to do was to prevent motorists from breaking the laws, and in the lowest court their action was held to be not contrary to the law, but this ruling has now been reversed by the Court of Appeals.

#### Headlight Patent Sustained.

The Badger Brass Manufacturing Company, of Kenosha, Wis., has recently obtained a final decree, sustaining Letters Patent No. 841,799, dated January 22, 1907. granted to George Maris and La Société Besnard, Maris & Antoine, of Paris, France, for improvements in lamps and headlights. The suit was brought against Herman Saxon, at New York city, in the Southern District of New York. The usual perpetual injunction was granted against Herman Saxon and his agents.

#### Legal Notes.

Motorists of Vermont take certain pride in the fact that the State authorities received only six complaints during the past year regarding non-compliance with the automobile regulations.

The Chicago City Council has passed an ordinance requiring front and tail lights on all horse drawn vehicles, and the Chicago A. C. is taking steps to assure a universal enforcement of the measure.

. A new ordinance which limits the time that cars may be left standing at the curb in the downtown district to one hour went into effect in Chicago on November 2. The physicians and some other automobile users of that district strongly protested against the measure.

The Chicago City Council on November 1 passed an ordinance providing for the examination and licensing of all drivers of taxicabs and other public motor vehicles, and creating a board of registry to conduct the work. It has not yet been announced when the measure will go into effect.

An automobile concern, known as the Only Car Company, recently incorporated with a capital stock of \$300,000, has purchased the E. O. Lawrence property at Echo, L. I., and will immediately start the erection of factory buildings, the largest of which will be of concrete with a floor space of 16,000 square feet. The output of the company will include two, three, four and five passenger cars, taxicabs and light delivery wagons. Work on sample cars is now being carried on in temporary quarters. M. Francois Richard, M. E., will have charge of the works.

### CULLED FROM OUR FOREIGN EXCHANGES.

#### Overhauling a Motor.

When it becomes necessary to overhaul a motor the latter will usually give notice of the fact itself by giving out a very characteristic metallic sound, well known to every experienced driver under the name "knocking." The knocking is especially pronounced if the ignition is advanced slightly too much. This metallic sound is the result of shocks between the connecting rod and the piston pin on the one hand, and the connecting rod and the crank pin on the other, due to play in the bushings of the rod. As soon as this knocking becomes at all pronounced it is advisable to discontinue driving the car. The writer has seen connecting rod heads worn to such an extent as to split apart. This entailed the immediate bending of the crank shaft, and the connecting rod being no longer maintained in place broke at one stroke through the bottom of the crank case.

The first precaution to take in case a motor knocks is to demount the cylinders, after having first removed the inlet, exhaust and water pipes. This demounting process in general does not involve any difficulties. However, in some of the older types of motors the cylinder heads are separate, and these separate heads must not be taken off, as it is very difficult to make a good joint again. On the contrary, the cylinder and head should be removed together, as though they were made in one niece.

After this has been done one may easily ascertain by means of the hands if there is any play at either end of the connecting rod; if there is the crank shaft, the connecting rods and the piston pins must be





Fig. 1.

taken apart. In certain motors this latter disassembling process is quite difficult. These are the motors in which the crank shaft is introduced from the ends, the bearings being supported by end plates bolted to the casing. It is often a very difficult job in the case of such motors to remove the connecting rod caps inside the crank case, which must be done before the crank shaft can be withdrawn.

At the same time as the crank shaft the cam shaft and its gearing must be taken

out. Before disassembling the cam gearing it is necessary to mark the gears by means of prick punch marks in order to avoid laborious trials in putting the gearing together again. After the motor has thus been dissassembled, and all pieces have been duly cleaned by means of gasoline, the separate parts are taken in hand succes-

#### CRANK SHAFT.

The main journals and the crank pin journals must be carefully examined. As

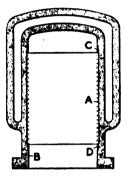


FIG. 2.

the crank shaft is the most expensive part of the motor it must be saved as much as possible. In most cases all of these journals will be found to have worn more or less oval, but as in general the crank shaft is not hardened, it is easy to true them up in the lathe. For truing up the main journal the crank shaft is placed in the lathe between centres, but for truing up the crank pin journal the crank shaft must be placed in special brackets, which bring the crank pins in line with the lathe centres.

If there are no suitable brackets available a lead lapping fixture is made use of (Fig. 1). This consists of two strips of wood, A and B, into which are sunk two half bushings of lead, C and B. The crank shaft being centred at F in the lathe, the workman presses the lead bushings, which have previously been covered with a paste of emery and oil, tightly against the pin. The lathe is then started up by the workman, who holds the "lapper" in his hand, the latter working exactly as a connecting rod. In this manner a good journal is obtained in short time.

No attempt should be made, however, to remove much material from the crank shaft, as, notwithstanding the fact that the sections are very liberally proportioned, there is danger of breaking the shaft, or, at least, of bending it. A reduction in diameter of one sixty-fourth inch is already considered quite appreciable.

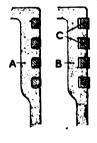
It is relatively rare that a crank shaft is found to be bent. This may occur if the flywheel of the motor strikes some obstacle in the road. A bent crank shaft is nearly always discarded, and only the factory which produced it can tell whether it can be righted again.

CYLINDERS, PISTONS AND PISTON RINGS.

The cylinders in the majority of cases are slightly ovalized. They may be made round again by reboring them, provided only very little stock needs to be removed, for if considerable material must be removed it is necessary to make new pistons of a larger size, which would be more expensive than to make new cylinders. If the compression rings are worn, they must be replaced, and care must be taken to nicely fit and grind the rings into the cylinders.

In this connection it should be remarked that a worn cylinder always has more or less the section shown in Fig. 2. The portion A, of a slightly increased diameter, is that where the piston moves up and down. The compression rings must, therefore, be forced through the section B and then expand in A. It is this latter diameter to which they should be adjusted. It is, moreover, a good plan to take out a light cut at C and D in order to remove the lower and upper shoulders of the "counterbore" A. If this is not done, after the slack on the connecting rod heads has been taken up the piston may hammer against the offset or shoulder and cause a mysterious noise. Where this precaution is neglected the motor, after being overhauled, often knocks as much or more as before, and much time may be lost in looking for the cause of this knocking.

With regard to the pistons there is little to be said, except that frequently the compression rings have too much play in their grooves, which take on a section similar to that shown at A, Fig. 3. The piston should



3712 Fig. 3.

then be put into the lathe and the grooves turned out to the normal section B, and special compression rings C must be made to fit these grooves without play.

If the cylinders are fitted with hand hole plates or cover plates for inspecting the interior of the water jackets these covers should always be taken off and the jacket space cleaned of the deposits of lime, as the cylinder walls will be nearly always found heavily incrusted. The valves are then ground into their seats,

after the latter have first been trued up with a valve seat cutter, if that is necessary. The cylinders are then in working condition again.

#### BEARINGS AND BUSHINGS.

The bearings (we are not referring here to ball bearings, which are as yet very little used in automobile motors) are of two different kinds, according to whether the bushings are entirely of bronze, or whether they are of babbitt. If babbitt bearings are used the babbitt is melted up and new bushings are cast, which requires a somewhat special equipment. In the case of bronze bushings, on the other hand, if the bushings are badly worn there is no other course open than to replace them entirely. If they show only slight wear it may be sufficient to repolish them by means of a scraping tool. If they are slightly more worn they may be counterbored and lined with babbitt. In every case the bushings and journals should be fitted by means of a scraping tool and red lead on the shaft until the bearing is perfect. This attention must be given to the main bearings of the crank shaft, the crank pin bearings and the cam shaft bearings. After the bushings have thus been thoroughly adjusted one must not forget to place oil holes in the proper positions nor to cut oil grooves in the bushings

The connecting rods and the cam shaft generally wear but very slightly, and all that is necessary to do is to examine them as to their straightness, as well as with respect to the keying of the cams, if the latter are not made in a single piece with the shaft.

#### ASSEMBLING.

This is the most delicate part of the entire process. The operation is the easiest in the case of a four cylinder motor having only three crank shaft bearings, especially if the bearing caps are independent of the crank casing. In that case the lower half of the crank case serves only as a dust guard and an oil well, and it is put in place only after all the bearings have been completely adjusted, which can be done in full view of the operator. Every part can then be thoroughly examined from underneath. Special care should be taken to see that everything turns nicely, that the connecting rods have plenty of play and do not cram any of the pistons in the cylinders. That the connecting rod heads are properly fitted on the crank pins is shown by the fact that they turn on the pins with some slight friction without oil. In the case of other motors the process of reassembling is sometimes quite difficult. The operator must not be in haste, and the process must be recommenced, if necessary, a number of times until perfect results are obtained.

After everything has been put back in place the cam gearing is taken in hand, which is put in place alone if the gears have been properly marked: then the lift of the valves is adjusted, either by filing off the valve stems or by adjusting the ad-

justable push rod heads, if these are provided.

The flywheel is then put back in place and the motor is connected to the shop line shafting by means of a belt running over the flywheel, after having first flooded the crank case and cylinders with oil. The pistons are thus allowed to run themselves in for a couple of hours. The motor is then cleaned, and is ready to be placed on the testing stand, if one is available; if not, it is put back into the car, which, after all, is an excellent testing stand as well. It will be seen from this that the overhauling of a motor is a tedious and delicate operation, and it is therefore not advisable to confide it to inexperienced hands. -Pierre Maillard in Omnia.

# Imports and Exports for September.

September seems to have been an off month for automobile imports, only 150 cars valued at \$231,811 and parts valued at \$80.-400 having been imported, as compared with 219 cars valued at \$352,295 and parts valued at \$103,038 during the same month last year. The returns for the two months show clearly how Italy is gaining on France in respect to automobile exports to the United States. In the following enumeration of the cars imported from the different countries during September last the figures in parentheses represent the number of cars imported from the same countries during the same month the previous year: France, 74 (156); Italy, 44 (27); United Kingdom, 14 (33); Germany, 7 (2); other countries, 11 (1). During the nine months ending with September last there were imported 1,208 cars valued at \$2,218,414 and parts valued at \$656,371, as compared with 956 cars valued at \$1,803,-889 and parts valued at \$451,469 during the same period the previous year. The figures for the different countries for these two periods, respectively, show that the imports from France have remained practically stationary, while the imports from Italy have increased about 80 per cent., and the imports from Germany by more than 400 per

September was another banner month for exports, there being exported 286 cars valued at \$373,754 and parts valued at \$01,658, a total of \$465,412, as compared with 128 cars valued at \$235,607 and parts valued at \$42.310. a total of \$277.917 during the same month last year. During the nine months ending with September last there were exported 2,426 cars valued at \$5,481,707 and parts valued at \$618,150, a total of \$6,099,-857, as compared with 1.812 cars valued at \$3.805,569 and parts valued at \$477,159, a total of \$4,282,728 during the same period the previous year. The heaviest increase is shown by the exports to British North America, which practically doubled and attained to near the \$2,000,000 figure for the first nine months of this year. The exports to Mexico also increased largely.

# Wisconsin Engine Company Takes Up the Owen Thomas Car.

The Owen Thomas Motor Car Company, of Janesville, Wis., is to be moved to Corliss, Wis. George Tener, of Pittsburg, one of the principal owners of the Wisconsin Engine Company at Corliss, and his associates have purchased the stock of the Janesville men who are backing Owen Thomas in the manufacture of the "O.-T. Six," and will reorganize the concern, increasing the capital to \$500,000. The Corliss works could easily be arranged to take care of automobile manufacture as it stands, but additions will be erected and the 1910 production will be rushed.

#### Milwaukee Show Dates Set.

The second annual Milwaukee automobile show will be held in the new \$500,000 Auditorium at Milwaukee, Wis., from February 22 to 27. The Milwaukee Automobile Club has started on preliminary work. The new building covers one square block, with a main hall covering more than half a block, the remainder being divided into smaller halls. The building is admirably suited for an automobile show, having a great oval arena, with a large stage at one end. The show committee appointed by President Drake is Dr. Louis Fuldner, chairman: Lee A. Dearholt, O. F. Fischedick and A. C. Brenckle.

#### Start of Los Angeles-Phœnix Race.

The start for the Los Angeles, Cal-Phœnix, Ariz., race took place at the former city on Saturday last, the following cars being dispatched at fifteen minutes intervals, beginning at 10 o'clock a. m.; Isotta-Fraschini, Max Persman: Elmore, George Dake; Pennsylvania, W. L. Vail; Dorris, W. R. Harrison; Franklin, Guy Irwin; Studebaker, Bert Latham; Ford, C. L. Harris: Columbia, H. Stone; Buick, J. K. Nikrent; Apperson, Harris Hanshue. The distance is 480 miles, and includes a long stretch of sandy desert, which makes it necessary for the cars to carry along all of their supplies and food for the drivers.

# Hatcher Auto-Parts Company Taken Over by Liggett Spring and Axle Company.

The factory plant and stock of the Hatcher Auto-Parts Company, Cleveland, Ohio, have been purchased by the Liggett Spring and Axle Company, of Pittsburg. The specialties manufactured by the Hatcher Auto-Parts Company will now be manufactured by the Liggett Company. In addition, the latter company are turning out at this time from their plant at Monongahela, Pa., all types of high grade automobile springs. They are now turning out roller bearings of an improved type, and also front and rear axles for several sizes of cars. William A. Cluff, who for the past five years has been manager of the Hatcher Auto-Parts Company, remains in charge of the Cleveland factory.

### GARAGE AND SALESROOM.

The Illinois Garage Association.

The Illinois Garage Association was organized in May, 1909, with the following officers: Lathrop H. Collins, Terminal Garage, president; A. H. Blair, Drexel Auto Company, vice president; H. E. Halbert, Garfield Park Auto Garage, vice president; John W. Morsbach, Lake View Auto Company, secretary; James F. Mraz, Edgewater Garage, treasurer; R. F. Patterson, manager.

The association undertook to remedy many of the difficulties of the garage owner in conducting his business under the bad conditions existing in the city of Chicago in this line of industry. The first step in this direction was to have the various garage owners get acquainted, so that they were in a position to communicate with each other, not only on business but socially. This led to a comparison of individual experiences in doing business with that very undesirable class of patrons who, after running up a large bill in one garage, leave it without paying the bill and go to another garage where they repeat the performance, so that in some cases it was found that a certain car owner had run up a bill of considerable size in each of five different garages on the north side of the city. The association now takes care of this class of patrons by classing them as "delinquents." A list of these is kept up to date, and furnished to each garage member who consults it before opening accounts with new customers.

The matter of collections is also looked after by the secretary of the association, and this furnishes another line on those who neglect to pay their bills without justification or excuse.

A most important step in the protection of the organization was the promulgation of a uniform set of garage rules. These rules are posted in a conspicuous place in every association member's garage. The patrons are informed that they may procure a copy on application at the office. The adoption of the rules was followed by mailing a copy of same to each garage patron at the time the monthly statements were sent out. These garage rules protect the garage owner from and against liability in all of the many situations and contingencies in connection with fires, accidents, explosions, loss of personal effects from cars, careless chauffeurs, the quantity and kind of service the garage is to render, and when monthly bills must be paid. The rules also cover the question of liability for damage to cars while in the possession of chauffeurs, the insurance feature, defining dead storage, notifying delinquent owners that the car will be held unless charges are paid, and requiring notice from the customer of his intention to terminate his storage contract

so that the space may be rented to new customers.

The matter of the purchase of supplies through the association for its various members, in order to get the benefit of the quantity price, is also under consideration, and plans are being perfected for the handling of this matter satisfactorily. This presents a good opportunity for effecting a large saving in this branch of garage expense.

The question of prices has not been interfered with except as between competing garages in some particular neighborhood, where the association uses its good offices and best efforts as arbitrator to promote peace and harmony, to the end that those particular local garages may get together and settle their differences among themselves without interference or coercion of any sort from the association. This has been found to work far better than would any attempt of the association to control the situation.

Another feature about to be inaugurated is the distribution of a garage credential certificate among the patrons whose record for prompt payment of bills is good. The association issues these credentials which are turned over to the garage members. The garage then presents the same to its patrons with instructions how they are to be used. The object of these credentials is to introduce, identify and procure credit for the holder in the event of an emergency breakdown when on the road anywhere in the vicinity of an association member, so that upon presentation of the certificate the holder may secure prompt and courteous treatment as well as such credit as he may reasonably require for service or supplies sufficient to enable him to proceed on his

The membership of the association now embraces about 60 per cent. of all the garages in Chicago. A banquet has been arranged for to be given at one of the prominent hotels some time during the current month, at which a large increase in membership is expected.

The situation among the garage owners has been vastly improved through the efforts of the association, and the members are most enthusiastic over what has been accomplished and what the future will bring forth. The association maintains an office in the Corn Exchange Bank Building.

#### Garage Notes.

BRIDGEPORT, CONN.—Plans for a garage for the police and charities departments have been approved by the mayor.

GOUVERNEUR, N. Y.—The new garage for A. S. Whitney, on John street, will be thrown open to the public this month. The building is one of the most modern con-

structed, and over the garage proper is a large hall, where social events may be held.

WATERTOWN, MASS.—Charles Brigham is erecting a one story garage on Garfield street, to cost \$2,500.

ATCHISON, KAN.—E. B. Westfall, of the Kirkpatrick-Westfall Automobile Company, is looking for a site for a garage in this city.

DE KALB, ILL.—The Dean Auto Inn Garage have had plans drawn for the construction of a garage in the heart of the Glidden House.

St. Louis, Mo.—Seneca N. Taylor has been granted permission to erect a two story brick garage on Delmar avenue, near Clarendon avenue.

PHILADELPHIA, PA.—Plans are being prepared by Geo. H. Backmire for the erection of a two story, 66x100 foot brick garage at Eleventh street and Erie avenue, at an estimated cost of \$12,000.

COLUMBUS, OHIO.—The Speedwell Company, of Dayton, will soon open an agency in Columbus with Kimmel Brothers, in a new building at Spring and Fourth streets. Kimmel Brothers are already here with a demonstrator.

COLUMBUS, OHIO.—Frank Corbett, who represents the Maxwell in twenty-three counties in central Ohio, will soon move into his new salesrooms at 58 to 62 East Spring street. The building is now being remodeled for the agency.

SHELBYVILLE, IND.—The Clark Motor Car Company have leased temporary quarters in the Coliseum skating rink, where they will install machinery to carry on their business until the large plant now in course of construction is ready for operation.

WATERLOO, IA.—The Peters - Rockwell Auto Company, agents for the Cadillac, have secured the building opposite the Ellis Hotel which was formerly occupied by the Corn Belt Auto Company. The firm is composed of A. H. Peters and D. G. Rockwell.

BOSTON, MASS.—The Studebaker Brothers Company have awarded a contract for the erection of a two story and basement reinforced concrete garage on Cummington street. The building will be 171×50 feet, with a capacity for 120 cars. It will be ready for occupancy on January 1.

COLUMBUS, OHIO.—A number of changes in the Columbus and central Ohio agencies are to be made soon. The F. H. Lawell Company, which has been agent for the Franklin, and which conducted a general garage business on South Third street, will be succeeded by the Franklin Motor Car Company, recently incorporated with a capital of \$10,000, and will occupy a new building at Spring and Fourth streets, which will be completed soon by Caleb L. McKee. The building will be fitted up especially for

the agency, and will be quite elaborate. It will not conduct a garage business, but will maintain a repair shop and testing department. F. H. Lawell will be general manager. Associated with him will be S. D. Morgan and C. T. Phillips.

Houston, TEX.—The Houston Country Club will build a garage.

MINOT, N. DAK.—L. C. Eby has leased the Tompkins garage for two years.

Denver, Col.—J. H. Howard is building a \$2,000 garage at 800 Pennsylvania avenue. Foley, Minn.—A. V. Stimier will convert the creamery building into an up to date garage.

OMAHA, NEB.—Sweets-Edwards Automobile Company plan to erect a garage on Farnum avenue.

OKLAHOMA CITY, OKLA.—The Lee Motor Car Company have taken larger quarters at 27 West First street.

ONTARIO, CANADA.—The Imperial Motor Car Company will erect a garage at 85-93 East Richmond street.

New HAVEN, CONN.—Wm. T. Dill will erect a 44x110 feet brick garage at 398 Crown street, near Howe street.

ATLANTA, GA.—The Piedmont Motor Car Company, agents for the Parry "30," will open a garage and showrooms at Ivy street and Auburn avenue.

SACRAMENTO, CAL.—Fred T. Kitt will build a garage for electric vehicles exclusively. He is agent for the Columbus and Waverley electric lines.

Los Angeles, Cal.—Mountain & Carrigan, agents for the Royal Tourist car, moved into their new garage and salesrooms on Olive street last week.

PHILADELPHIA, PA.—Irwin & Leighton were granted permits for four one story garages, each 40x110 feet, at Nos. 330 to 340 South Broad street, to cost \$27,000.

GRAND RAPIDS, MICH.—Work on the Dwight garage at 172-4 North Ionia street is nearly completed. The upper floor is occupied and the lower floor will be ready for occupancy in a few days.

CHICAGO, ILL.—Wm. T. Maypole has purchased a plot of land, at a cost of \$100,000, on which he will erect a building suitable for the automobile industry.

Indianapolis, Ind.—An agency for Frayer-Miller trucks has been established here by W. D. Cost and P. M. Orlopp. A building at 224-226 South Pennsylvania street has been leased and converted into a garage and salesroom. The Rambler Automobile Company, Indianapolis representatives for the Rambler, has also taken temporary quarters in the building.

INDIANAPOLIS, IND.—Temporary quarters of the Indianapolis sales branch of the Maxwell-Briscoe Motor Company have been moved from 320 East Market street to 416 Massachusetts avenue, in the building recently vacated by the State Automobile Company. The company is building a \$60,000 building at Vermont and Illinois streets, which it will occupy in about three months. The Peck Motor Car Company, Indiana representative of the Cadillac, has moved

from 25 East Ohio street to Motor Row in North Delaware street.

OMAHA, NEB.—Byron Reed Company will build a brick garage at 1912-1916 Farnam street, to cost \$10,000.

NEW YORK CITY.—The West End Garage Company have taken a lease of the building at 574-576 West 130th street.

BUFFALO, N. Y.—Oliver N. George, 371 East street, is to build a one story concrete block public garage, to cost \$2,000.

CEDARVILLE, N. J.—The garage of Dr. W. P. Glendon was destroyed by fire on November 1. A defective flue was the cause.

ROCKFORD, ILL.—Savage & Love Company are preparing plans for the erection of a 90x50 foot garage at 650 South Main street.

PITTSBURG, PA.—W. H. Cassidy has obtained a permit to build a one story brick garage at 622 St. James street, to cost \$2,000.

New HAVEN, CONN.—Wheeler & Wuestefeld have moved into their new garage and repair shop at Commerce and Temple streets.

SUFFERN, N. Y.—A fire in the garage of C. J. Ryan destroyed the building, together with three automobiles and seven thoroughbred horses.

ATLANTA, IA.—Ground has been broken for the erection of a garage on Walnut street, between Fourth and Fifth streets, for Albert Johnson.

CLEVELAND. OHIO.—Kredley & Bowlus have been granted a permit to build a garage at East Eightieth street and Carnegie avenue, S. E., to cost \$4,000.

Los Angeles, Cal.—A \$15,000 garage will be erected for Wm. Garland on the west side of Olive street, between Twelfth and Pico streets, in the near future.

PORTLAND, ORE.—O. E. McCarthy, of the Portland branch of the Locomobile Company, has recently established branches for both the Locomobile and Oakland cars in Medford, Eugene and Salem.

SPARTANBURG, S. C.—E. T. Cantrell and Chas. Parker will erect a 72x40 foot garage on King street. Mr. Parker is proprietor of the Spartanburg Automobile Company, agents for the White Steamer.

LOGANSPORT, IND.—M. E. Cline has sold the Broadway Garage to Carter & Moore. Mr. Cline will retain his lease on the building, but the stock and equipment will be turned over to the new proprietors.

JERSEY CITY, N. J.—Work is progressing rapidly on the \$50,000 garage of the Crescent Automobile Company at 2565 Hudson boulevard. This new garage will provide accommodations for 250 machines.

INDIANAPOLIS, IND.—Forest and Howard Cummings have bought the Alfey garage on Pike street, where they will conduct a modern garage. The new firm will have the agency for the Ford, Regal and Premier cars.

BANGOR, ME.—Harry Chapman and T. D. Bailey have purchased a 114x66 foot plot between Union and Hodgdon streets, on which they will erect a three story garage and machine shop. The building will be

centrally located, and house 100 machines. The repair shop will be in the basement, where a supply of auto accessories will be kept on hand.

BEATRICE, NEB.—Victor E. Lang has become secretary, treasurer and general manager of the Beatrice Automobile Company, which recently moved into its new garage on North Fourth street.

NEWARK, N. J.—R. M. Terry, the local Palmer-Singer agent, has taken a long term lease on the property at 38 William street, corner Halsey street. The building is freproof and comprises a fine showroom.

Youngstown, Ohio.—The Interstate Automobile Company, which has taken over the agency for Ford cars in Mahoning, Lawrence and Trumbull counties, will open a garage and salesroom on Front street, near Champion street.

WILMINGTON, OHIO.—Minard Stephens has disposed of his interest in the Wilmington Garage to his partner, James M. West The concern will be incorporated under the name of the West Automobile Company as soon as preliminaries can be arranged.

GOSHEN POINT, CONN.—Edward S. Harkness has let the contract for the erection of a 100x110 foot, two and a half story fire-proof garage on his estate. The exterior will be of limestone and marble. One wing of the building will have a billiard room, a squash court and bowling alleys, the garage occupying the centre of the front. The approximate cost is said to be \$150,000.

# New Metropolitan Sales Organization.

William L. Colt, who organized and was president of the Cleveland Motor Car Company up to two years ago, and Harry L Stratton, who has been vice president of the Amalgamated Copper Company for several years, have organized the Colt-Stratton Company, and opened a salesroom at Broadway and Sixty-eighth street, New York. Mr. Colt is president of the new company, Mr. Stratton vice president and treasurer and Sydney H. Veal, formerly secretary of the Cleveland Motor Car Company, is secretary. The company will handle the new Cole "30" in the entire Eastern territory of the United States, and the Paige-Detroit in New York city and vicinity for a radius of 50 miles.

#### Ford Branch Managers Meet.

Branch managers of the Ford Motor Company held their annual convention at Detroit November 1 to 3. The report for 1909 showed an increase of 60 per cent. in the sales over the preceding year. On November 2, in the afternoon, the new factory was inspected, and during the evening a smoker was given at the Hotel Pontchartrain, followed by a Dutch lunch. On Wednesday night a banquet was served at the Country Club, at which J. W. Anderson acted at toastmaster. During the meeting the establishment of new Ford branches in Pittsburg, Cincinnati, Dallas and Omaha was announced.

#### Motorcycle Exhibits.

(Continued from page 542.)

pulley. This pulley is arranged to swing around the motor shaft as a centre in order to tighten the belt. This movement is obtained by a crank conveniently placed to the hand of the rider. The transmission of the 3 horse power twin is by a V belt direct to the rear. The 4 horse power, however, is provided with a two speed gear and a free engine clutch. All models are equipped with magneto ignition. Another interesting feature is the spring fork, which is of the link type, but the side rods telescope, and together with the links and stationary forks form triangles on both sides.

#### THE GREYHOUND MOTOR WORKS,

Buffalo, N. Y.—The motor of this machine has quite a number of special features. In the first place the flywheel is especially large, thus enabling the motor to run smooothly at slow speeds. The flywheels and crank pin are permanently assembled, and a connecting rod of the marine type is used. An option is given on V belt drive or a flat belt with idler. A spring fork of the parallel link type is used. In addition to this a spring seat mast is used just back of the brace, which would ordinarily act as the seat mast. Another feature is the method of holding the tank between the two horizontal tubes. This is accomplished by lugs clamped to both sides of the horizontal tubes. This avoids drilling of the frame tubes, and the consequent tendency to weaken them.

# THE MERKEL-LIGHT MANUFACTURING COMPANY,

Pottstown, Pa., show four machines, one a 23/4 horse power, single, with chain drive; two 4 horse power single, one with battery and the other with magneto ignition, and a 6 horse power twin. The three last named are equipped with V belt drive and the motors are ball bearing. A special feature of these machines is the use of an automatic pump oil feed which feeds the oil to the crank case and which has an adjustable stroke. The cam which actuates this is driven by means of a ratchet attached to one of the exhaust valve rockers inside of the cam shaft. This feature has now been in use for a year, and has given excellent satisfaction in use.

# THE CONSOLIDATED MANUFACTURING COMPANY,

Toledo, Ohio, manufacture the Yale motorcycle which they exhibit. The main improvements for 1910 are the use of a 55 inch wheel base and of a special design of drop frame. This year an option is given on a flat or V belt drive. If the former is chosen a special type of adjustable spring idler is provided. The singles are made in 3½ horse power, and equipped with either battery or magneto ignition. The twins are rated at 6 horse power, and are equipped with magneto ignition. The standard finish for these machines is French gray.

#### THE HARLEY-DAVIDSON MOTOR COMPANY.

Milwaukee, Wis., have three machines on exhibition, a 7 horse power twin and two 4 horse power singles, one being equipped with battery and the other with magneto ignition. This machine uses a flat belt for transmission, which on this model has been increased to 1¾ inches in width. Another radical improvement is the use of a new type of idler of ingenious construction, which is well protected from injury in case of a fall. The cooling flanges have about one-fifth more surface than in 1909.

#### MILTON W. ARROWOOD COMPANY,

Atlanta, Ga., are agents for the Wagoner motorcycle, built by the Wagoner Motor Cycle Company, of St. Paul. This machine is built along standard lines, with a 3 horse power motor and V belt drive. About the only change in the 1910 model is the use of 2½ inch tires in place of 2½ inch.

#### THE EXCELSIOR SUPPLY COMPANY,

Chicago, Ill.—This concern have on exhibition the Excelsior motorcycle. Besides this they carry a good line of both automobile and motorcycle sundries and accessories.

#### Tires and Tire Sundries.

THE FISK RUBBER COMPANY,

Chicopee Falls, Mass., have an exhibit of their regular types of bolted-on tires as well as a line of clincher tires of their manufacture. They are also showing and demonstrating their demountable rim. A feature of their exhibit is a 40x6 inch Fisk tire on a demountable rim, which is said to be the largest tire in the show, and is used on fire apparatus when high speed is desired.

#### MORGAN & WRIGHT,

Detroit, Mich., have a very extensive line of both motorcycle and automobile tires. A novelty in the latter line is their "Nobby" tread, a rubber non-skid formed of long rounded projections laid herringbone fashion on the tread. Another novelty in the tread line is a motorcycle racing tire which is a combination of the well known Bailey and corrugated treads. The corrugations are in the centre and the round projections at the sides. When the wheel inclines in rounding a corner the projections are brought into play to prevent side slip.

#### THE MICHELIN TIRE COMPANY,

Milltown, N. J., show a full line of their tires, both non-skid and plain, in standard clincher and quick detachable styles. They also show their quick detachable and touring demountable rims. A product which they are featuring this year is Michelin Mastic, which is used for repairing cuts in casings, and also for repairing punctures in inner tubes without the use of patches. They also have a complete line of their various tire tools.

#### THE REPUBLIC RUBBER COMPANY.

Youngstown, Ohio.—The special feature exhibited by this firm is their rubber non-skid tire. This has been in use now for a considerable time, and is said to have proven remarkably satisfactory. It is provided with oblong projections with rounded ends placed along the circumference of the tire. These are hemispherical in section. This, as well as plain treads, is shown in both clincher and quick detachable forms.

#### THE AJAX-GRIEB RUBBER COMPANY,

Trenton, N. J., call particular attention to the 5,000 mile guarantee which accompanies each tire. Their rubber non-skid is another point which they are featuring. In this the tread is crossed in both directions by deep V shaped lines, thus forming lozenge or diamond shaped projections.

#### THE FEDERAL RUBBER COMPANY,

Trenton, N. J., feature their rubber nonskid tire. This is of the type with projections on the tread. In this case they take the form of Maltese crosses, which are placed in rows. These are carried in both clinched and quick detachable types. Besides this there is also carried a line of plain treads.

#### FIRESTONE TIRE AND RUBBER COMPANY,

Akron, Ohio, show their regular line, which includes their rubber non-skid, which has the word "Firestone" in raised letters placed diagonally across the tread of the tire. They are also showing their demountable rim, which has now been on the market for a year. While it has undergone no radical changes, one or two minor improvements made greatly facilitate a change on the road. This rim can be supplied either for clincher or quick detachable tires. When supplied for the latter it may be used as such while on the wheel without reference to the demountable feature.

#### THE HARTFORD RUBBER WORKS COMPANY,

Hartford, Conn., show their regular line and have nothing at present particularly new. They are, however, featuring their Wire Grip non-skid tire. This is carried in both the Dunlop and standard clincher and quick detachable types, as well as in solids for truck use.

#### THE GOODYEAR TIRE AND RUBBER COMPANY,

Akron, Ohio, make a feature of their air bottles. The use of the same is demonstrated by means of an air tube connected to one of them, which also has another valve attached to it, through which the air can be allowed to escape once the tire is inflated. They also have a full display of their regular line, which is well known.

#### THE EMPIRE TIRE COMPANY.

Trenton, N. J., are for the first time exhibiting their new demountable rim. The clamps which hold the rim in place are so arranged that after the nuts are loosened about five turns they can be turned out of the way, thus doing away with the necessity of removing either them or the nuts from the wheel. This greatly facilitates a change on the road. Another feature of this firm is a butt ended motorcycle tube. They also have a complete line of tires of both the quick detachable and clincher type.

#### THE G & J TIRE COMPANY,

Indianapolis, Ind., show their full line of automobile and motorcycle tires, as well as a line of motorcycle grips, lamp connections and equalizing chambers. In addition to this they have tire tools, cement, acid cure solution and blow-out patches.

#### THE DIAMOND RUBBER COMPANY,

Akron, Ohio, exhibit both standard clincher and quick detachable tires to fit all leading makes of rims, and with various types of tread. They also carry a line of solid buggy tires. A new product of this company is a line of both high and low tension ignition cable. They are also showing their improved Marsh rim, which is greatly simplified and strengthened. In addition to this they have their demountable rim on exhibition, which has undergone radical changes.

#### JAMES L. GIBNEY & BROTHER,

Philadelphia, show the Auto-Electric vulcanizer, which is adapted to be used with either alternating or direct current for mending cuts in tires, as well as punctures in inner tubes. They also show a "wireless" tire, in which a hard rubber base is dovetailed into a steel band, the soft rubber tire proper being secured to the hard rubber base.

THE UNIVERSAL TIRE PROTECTOR COMPANY, Angola, Ind., show their emergency tire sleeve, which is of steel studded leather. It is secured in position by a very ingenious ratchet winding arrangement known as the universal anchoring device. They also have a full steel studded tread which has a special attaching device original with this firm.

#### THE LEATHER TIRE GOODS COMPANY,

of Niagara Falls, N. Y., show an interesting new accessory in the way of tire saver mud chains-chains strapped in single lengths to the spokes, or complete chains mounted, as ordinarily, clear around the wheel, but strapped with an automatic ightening band to the spoke. Neither chain, it is claimed, will slip under any condition. Neither will they hurt the tire, because of the protection afforded by the heavy thickness of chrome-tanned leather between iron and rubber. This protection. the company claim, makes their single length chain practicable. The chrometanned leather is used also in the straps. It is unaffected by water. The exhibit also included the Woodworth tire protector of the company's manufacture.

#### THE B. F. GOODRICH COMPANY,

Akron, Ohio, exhibit their full line of both solid and pneumatic tires of all kinds.

They are featuring their so called "Wireless" tires for trucks and other heavy vehicles. In this tire the tire is formed on a steel band with circumferential dovetail grooves. In these grooves is affixed a band of hard rubber onto which the soft rubber or tire proper is vulcanized. The tire is secured to the wheel so that it may be easily removed when it becomes worn. Another features is their Palmer-Webb tire, which is designed especially for electrics with the idea of giving increased mileage.

THE KING LEATHER TIRE COMPANY,
Racine, Wis. This tire, which is of the metal studded, anti-skid type, is covered completely with leather from the fabric outward. This, it is claimed, not only makes the tire more immune from punctures but also adds so much to the strength of the same that it is practically immune from blow-outs and rim cuts. The section of the tire seems to show that considerable thought his been given to its construction.

#### THE RUTHERFORD RUBBER COMPANY,

of Rutherford, N. J., present a complete display of Sterling automobile plain tread tires and blue tubes, each shown complete and in sections. Sections of Sterling solid rubber tires for buggies are also shown. The blue outer finish of the tubes is claimed to prevent air checking or cracking when the tubes are folded in boxes. The splicing of these is done diagonally, with the valve passing through both of the splices. The whole tube is vulcanized.

#### Accessories.

THE UNITED MANUFACTURERS, NEW YORK.

WEED CHAIN TIRE GRIP COMPANY.—No radical changes were shown in this line, with the exception that the cross links are now case hardened. The regular line of chains was shown, and the equalizing device.

THE NEW YORK AND NEW JERSEY LUBRICANT COMPANY showed their line of non-fluid oils, as well as a line of motor cylinder oils. As usual, they had at their stand a transmission with glass covered case to show the action of their non-fluid oil.

C. A. MEZGER shows his line of automatic wind shields, which have had no radical changes made in them for the past year. He also shows the original Mezger "Soot Proof" spark plug.

THE JONES SPEEDOMETER COMPANY.—A new line introduced this year is a line of motorcycle speedometers arranged to be fitted to the handle bar. These are made in various models, with and without trip, and total odometers, and with and without maximum hands. A new product of this firm is the Jones electric horn, which is of the type employing an electrically operated vibrating sound producing device. Another novelty is a combination bulb and electrical horn in one instrument, with a common bell. The object of this combination is to

provide a hand horn in case of the battery being run down.

THE CONNECTICUT TELEPHONE AND ELEC-TRIC COMPANY.—This concern show their regular line of coils, timers, switches, etc. Their battery and magneto switch has been improved in its mechanism so that when the plug is partially withdrawn the battery will not be grounded. They have, however, brought out two entirely new lines. One of these is a master vibrator coil. The master vibrator of this coil is made double, so that in case of one of the vibrators getting out of order the unit to which the master vibrator is affixed can be withdrawn and turned end for end, and replaced. This brings the other vibrator into action. Buttons placed on the tops of the coil units are used to cut out the ignition from any individual cylinder for testing purposes. The Type X coil was brought out to meet the demand for a low priced coil. In this coil the units are enclosed in a hard rubber cylindrical case with a square top. The connections are made by bands which surround the cylindrical case. It is therefore impossible to put a unit into the box the wrong way.

#### HERZ & CO.

show their Bougie-Mercedes plug, with insulation formed from imported stone, that (it is claimed) will not crack under heat, and consequently will not short circuit. They also show the new pattern Herz timer, fitted with a ball bearing roller. Another detail is the Herz distributor, with its spring detachable terminals and snap contact.

#### RANDALL-FAICHNEY COMPANY.

of Boston, feature their exhibit of the new "Jericho" horn, known as the "road clearer," operated by the exhaust, and for which the most lusty voice among all horns is claimed. This was put on the market last spring. A model of the horn, 5 feet high, electrically illuminated, is on exhibit, with normal size models. It is claimed that this horn can be heard a mile against the wind. and 2½ miles with the breeze.

#### CLOUD-STANFORD COMPANY,

of Atlanta, the toggery outfitters, have a classy exhibit of personal apparel and equipment for motorists. They show largely from the well known line of the Scandinavian Fur and Leather Company, New York for whose goods they have the exclusive local agency. Their exhibit is made up of garments and personal equipment for owner and chauffeur—gloves, caps, goggles, Thermos bottles, lunch baskets, robes, coats, etc. and sweater coats of the American Hosiery Company.

#### THE POST & LESTER COMPANY.

Hartford, Conn., feature in their exhibit the Volier and Rival automobile horns. They also make an attractive and convincing display of their ignition cable, which they furnish to many manufacturers. The company's line of automobile clocks—Luna,

Sterling, Venus and Imperial—is also shown. The company's lamp and generator equipment, adjustable to all makes of cars, is presented. Their red rubber horn bulb, claimed as of purer and better wearing material than black rubber bulbs, is shown, with an excellent line of tire covers and lamp covers.

#### THE SPRAGUE UMBRELLA COMPANY,

of Norwalk, Ohio, exhibit an attractive line of vehicle and automobile tops, canopies and wind shields. Among these is their new 1910 model of "rain vision" shield, which can be set at any angle in four positions. Their demonstration shows the seamless drawn tubing of which the shields are formed, and also the flush joints of the connections, which eliminate any bolts in the way of cleaning and polishing. Another feature claimed for the wind shield is that the lower part of its metal frame covers the filler board, leaving no crack for soap and water to enter.

#### CHARLES E. MILLER.

of New York, claiming to be the largest automobile supply house in America, with ten branches in as many principal cities of the country, shows extensively. The firm's latest branch has just been opened in Atlanta. This exhibit shows numerous details of accessories. Among them are Brampton chains and Miller porcelain spark plugs. The exhibit shows a full line of automobile and motor boat supplies.

#### WHEELER & SCHEBLER,

of Indianapolis, are on this floor with a complete exhibit of all their various models of carburetors, including their new racing model. This company, in addition to its participation in the show, also has a corps of factory experts in attendance at the Speedway events in Atlanta. The exhibit's proud claim is that there are over twenty makes of car in the show equipped with Schebler carburetors. Wheeler & Schebler magnetos are also shown.

#### THE C. A. SHALER COMPANY,

of Waupun, Wis., presented an interesting exposition of their complete line of Shaler electric vulcanizers, adapted to be operated on ordinary city current. The claim for these machines is that they can do any work that is practicable on any size of automobile tire, inner tube or outer casing. The latest addition to the Shaler line was shown—the first motorcycle tire vulcanizer in the market. This is operated on the same principle as Type C of the Shaler automobile tire vulcanizer, applying the heat on the inside of the tire where the new fabric is placed and obviating the necessity for cutting away any of the rubber in the tread, as would be necessary if the heat were applied to outside.

#### THE HARTFORD SUSPENSION COMPANY, New York city, manufacturers of the Truffault-Hartford shock absorbers, have made no material changes in this line for the past year. As on former occasions, they have

tried to make their exhibit interesting by some novel method of demonstrating their product. This year it takes the form of two small model automobiles, about one-ninth size, one equipped with the device, the other without it. These are both run on small rollers, with jounces on them of equal size. The difference in the riding quality is quite marked. The miniature shock absorbers fitted to the model car are a work of art, being an exact reproduction in every way of the full sized article.

#### JOSEPH DIXON CRUCIBLE COMPANY.

Jersey City, N. J., show a full line of their graphite lubricating compounds suitable for the lubrication of various parts of the mechanism, from chains to gear cases and the leaves of springs. To illustrate the action of their gear lubricating compound they have a gear box in operation with glass

THE SHIPMAN'S INSTRUMENT COMPANY, of Sunbury, Pa., show their interesting new meters that "tell how long, how fast, and how far." Several working models were shown, all on the same speed, and each checking the other with striking accuracy. These instruments, known as the Shipman speed indicators, show trip mileage, trip hours, season mileage, season hours and speed, all on the same face, and all with the same machine. Their slow moving parts are one of the strongest features. They are operated on the escapement principle, which enables them to show the average speed for each one-thirtieth of a mile.

#### W. F. POLSON.

of Buffalo, N. Y., displays his wind shields in various models. The use of channel rubber for cushioning the glass of these shields is a new feature. This cushion is to allow for the contraction and expansion of brass frames. Model M. for storm use, adjustable to an angle leaving a crack for vision, was shown. This model is also adaptable at an opposite angle to sultry weather use, for sending a draught back into the car and at the same time avoiding dirt and dust. The Polson automatic was shown, demonstrating its freedom from moving parts and its flush construction.

THE WARNER INSTRUMENT COMPANY, of Beloit, Wis., exhibit their new 1910 Warner Auto-Meters, with their new special feature of an inner electric light, which is operated by a push button on the body of the car, and obviates much of the inconvenience experienced heretofore in traveling after dark on road readings in a strange country. This is fitted on all the new models of Warner Auto-Meters. Another strikingly new feature of the 1910 Warner instruments is their showing of total mileage up to 100,000, instead of the 10,000 total mileage limit prevailing till now.

THE CHICAGO WIND SHIELD COMPANY, of Chicago, show their "Adjusto" model, with its split filler board that allows it

to go flat over the hood. One of the salient features of this shield is the protection of its springs in tubes. Another is the break in its adjustment, obviating all danger of slamming and consequent breakage of the glass. The "Dixie" model is adaptable to storm and weather use, being constructed with a double fold that permits it to be collapsed inward under the steering wheel.

# THE GABRIEL HORN MANUFACTURING COMPANY,

Cleveland, Ohio, one of the pioneers in the manufacture of horns of the exhaust blown type, show their regular line, and besides their new four tube horn, known as the Gabriel trumpet. This is a horn operated by keys so arranged that all the bugle calls used in the United States Army can be played on it. They also have a ten note "music horn," which can be used to play almost any of the simpler melodies. They are also showing the Foster shock absorber.

#### WILLIAM CRAMP & SONS,

of Philadelphia, exhibit in ingots and castings their manganese bronze and Parsons white brass metals. They are now being used largely in automobile construction. A number of complicated castings by the Wetherill Finished Castings Company were exhibited in these metals—crank cases, automobile axles, connecting rods, transmission cases, etc., of the models that are being used in Standard cars.

#### THE SIRENO COMPANY,

of New York, show a full display of their electrically operated automobile horns, known as the "mile-ahead" horns. These were shown with and without the projectors. All of the models are on the Sireno principle, but in the larger horns is demonstrated the magnetic brake that eliminates the siren sound, making a straight and powerful electric voice of one note.

THE STROMBERG MOTOR DEVICES COMPANY, of Chicago, exhibit their carburetors only, showing several different models, both in complete form and in assembly parts. Their new Type C, which has been out only a couple of weeks, has a double jet gasoline nozzle, and is especially designed for six cylinder motors. They show also their regular line of water jacketed and non-water jacketed carburetors.

THE NEVER-MISS SPARK PLUG COMPANY, of Lansing, Mich., exhibit a full line of their plugs, and also a line of electrical instruments manufactured by them—ammeters and voltmeters and combination voltammeters. They also showed their automobile clocks, among them being one of special design fitted for attachment to steering wheel spokes, so as to keep it directly before the driver.

#### LAVALETTE & CO.,

of New York, exhibit their direct high tension Eisemann magnetos in several different models. One special display was of the magneto fitted with oscillating advance magnets rotating about the armature, instead of advancing the cam. The claim for this is that the range of spark timing is unlimited. The Eisemann special spark plug with platinum spiral was also shown.

#### S. F. BOWSER & CO.,

of Fort Wayne, Ind., show a varied line of their product. They present representative outfits from their automobile accessories department for private and public garages, and limit their display to garage equipment. They show their portable and stationary gasoline tanks, their oil tanks—self measuring and fireproof—and their pump meters and filters.

#### THE NATIONAL CARBON COMPANY,

Cleveland, Ohio, have on exhibition a full line of their dry batteries of all shapes and sizes, both singly and in groups. The feature of their exhibit is their demonstrating or testing board, designed to show the characteristics of various ignition systems using batteries for ignition, both as to battery economy and synchronism of the spark.

#### ADAM COOK'S SONS,

New York, show their well known line of Albany tallow grease, with a side demonstration of their grease cups. This grease, which has been forty-one years on the market, needed no great introduction, as it is claimed that "you can get it anywhere in the United States."

THE VEHICLE APRON AND HOOD COMPANY, Columbus, Ohio, exhibit their Gordon tire covers, with a comprehensive display of automobile fabric supply goods—tire covers, trunks, muff and foot robes, plain robes, radiator covers, luggage bags, lamp covers, top dust hoods, etc.

#### THE HAVOLINE OIL COMPANY.

of New York, show samples of their oil, exhibiting also a complete display of trade packages in which their wares are retailed. They claim a high fire test for this oil, and the lowest percentage of carbon on the market.

#### . THE OLIVER MANUFACTURING COMPANY,

Chicago, Ill.—The Oliver jack is of the double ratchet type, a motion of the lever either up or down lifting the car. They are made in various heights, from 10 to 13 inches, and with a lift of from 7 to 9 inches. The handle is so formed as to make a good tire tool in case of necessity.

#### COLUMBIA LUBRICANTS COMPANY.

Monogram oils were shown by the Columbia Lubricants Company, of New York, as a straight line product from Pennsylvania crude lubricants. These gas engine cylinder oils are attractively displayed in sample tubes under glass and in trade packages.

#### THE BADGER BRASS COMPANY,

Kenosha, Wis., exhibit their very complete line of acetylene gas lamps and generators, electric side and tail lamps and oil side and tail lamps. Their exhibit, which is one of the very few lamp exhibits at the show, is located on the main floor and is in charge of W. C. Marion.

#### C. F. SPLITDORF.

of New York, exhibits his ignition specialties, including high tension magnetos, coils. timers, spark plugs, etc. The firm features its magnetos, which are made in quite a variety to suit different requirements. The claim is made that these operate so low a speed that a battery auxiliary is unneccessary.

### THE AJAX TRUNK AND SAMPLE CASE COMPANY.

of New York, show an attractive array of automobile touring necessities in their line. Among the details is a trunk, made in any shape and color to harmonize with requirements, fitted to contain two, three or five individual dress suit cases. The Ajax tire trunk is also shown, fitted with the new arch steel rim and steel clamps, for protection and security. They show, too, their demountable rim trunk, with its flat top allowing space for the valve of the rim, and with a handle permitting its being carried like a suit case from the car.

#### THE VEHICLE TOP AND SUPPLY COMPANY.

St. Louis, Mo., have on exhibition a touring car top on ordinary lines, as well as a special top known as the Du Quesne, for use on runabouts or roadsters with long raked steering columns, where it is desirable that the top should extend well to the front and yet give clearance near the seat for easy entrance.

#### THE PHANSTIEL ELECTRIC LABORATORY,

of North Chicago, Ill., show a line of ignition goods, including coils fitted with a vibrator of their own design using a stretched helical spring. They also show the Phanstiel magneto, which employs a separate transformer coil located in the bend of the magnets. The features of this magneto are easy removal of the circuit breaker for inspection and adjustment and the robustness of its parts.

#### THE LUTZ & LOCKWOOD COMPANY,

Aldena, N. J.,—The exhibit of this concern consists of the "S-X" ignition dry cell and the "S-X" magneto. This latter is novel in respect to the arrangement for four cells. Two transformer coils are used, one having its secondaries connected to cylinders Nos. 1 and 4, and the other having its secondaries connected to Nos. 2 and 3. Two circuit breakers placed opposite each other are employed, one operating one coil and the other the other.

#### THE STANDARD AUTO SUPPLY COMPANY

have a very large exhibit of all kinds of sundries and accessories for machines, including ignition accessories, plugs, timers, magnetos, etc., as well as goggles and radiator ornaments, etc. Among these are two comparatice novelties. The "Reliable Trouble Hunter" is a small lamp with reflector which

can be attached to the forehead by means of a rubber band. The safety air tire gauge consists of a self fastening tire connection fitted with a Schrader pump connection on one side and a simple plunger gauge on the other. Another novelty is the Le Tesophone four note bugle horn.

#### THE NEWARK RIVET WORKS.

Newark, N. J., show their folding friction wind shields. The upper part is retained at any angle with the lower by means of an ingenious friction joint formed between fibre and maplewood washers. It is claimed that this will hold in practically any position that it may be put.

#### THE WARNER TOP AND POLE COMPANY.

Cincinnati, Ohio, make automobile tops in great variety. Owing to lack of space they had none of their completed tops on exhibition, but showed various parts in different stages of manufacture, as well as cuts of completed tops.

#### THE CARTER-CRUM COMPANY,

show a line of autographic registers which are suitable for keeping garage accounts or those of repair shops, etc. A peculiarity of this make is the fact that the copy which is kept in the machine is cut off from the reel and filed away on a spindle.

# Henry Motor Car Company Secceeds Gary Company.

The Henry Motor Car Company, of Chicago, will succeed the Gary Motor Car Company, for whom the Chamber of Commerce of Muskegon, Mich., erected a factory in that city. W. L. Simonton, of Chicago, is president of the new company, and D. W. Henry, who was formerly connected with the Electric Vehicle Company, of Hartford, Conn., will be general manager. The factory building which has been erected is 500 feet long by 125 feet wide. Machinery will at once be installed, and it is planned to turn out 1,000 cars by August 1 next. Only a single type of four cylinder chassis is to be manufactured, which will be fitted with different types of bodies.

# Elwell-Parker Company Absorbed by Anderson Carriage Company.

The Elwell-Parker Electric Company, of Cleveland, Ohio, have been absorbed by the Anderson Carriage Company, of Detroit. Mich The former firm manufactures electric motors for vehicles, etc., and the latter electric carriages. The Elwell-Parker plant in Cleveland will be continued in operation, and M. S. Towson, who has been with the firm since 1902, becomes general manager of this plant, and also consulting engineer to the Anderson Carriage Company, acting in an advisory capacity with George M. Bacon, the designer of the Detroit Electric. The capital stock of the Anderson Carriage Company has been increased from \$500,000 to \$1,000,000. A production of 1.500 complete power plants at the Cleveland works is contemplated for next year.

### NOTES OF THE INDUSTRY AND THE SPORT.

#### Miscellaneous Notes.

The Studebaker Automobile Company, South Bend, Ind., have decided to make a separate department of their electric vehicle work.

The Scranton (Pa.) A. A. has made a grant of \$2,000 to the borough of Moscow to aid it in the construction of a new main road through the borough.

The American Motor Company, of Brockton, Mass., have begun work on a two story 100x50 foot addition to their plant, and plans are in hand for another addition of the same size.

The capital stock of the King Leather Tire Company, with works at 3417-3419 Vliet street, Milwaukee, Wis., has been increased from \$20,000 to \$40,000, to carry the increased production.

It is stated that 103 members of the Motor and Accessories Manufacturers will this year exhibit at the Grand Central Palace Show, who will occupy floor space to the extent of 14,870 square feet, practically the same as last year.

A hill climb on the well known Edgewater Fort Lee hill opposite New York is being planned for Thanksgiving Day to celebrate the repaving and resurfacing of the hill. The Edgewater (N. J.) Motoring Society is promoting the event.

A meeting of business men was held at the office of the Buick Motor Company in Flint, Mich., on October 29, for the purpose of forming a \$500,000 organization to provide workmen's dwellings, for which there is a great demand in Flint at present.

The E. R. Thomas Motor Company, of Buffalo, have decided to use steel flywheels on their 1910 motors, and have placed an order for same with the Carnegie Steel Company, of McKeesport, Pa. The flywheels will be made in the Homestead plant by the Slick process.

The National Motor Vehicle Company, of Indianapolis, is erecting a building that will be used exclusively for office purposes. It is to be a two story frame and stucco structure, 25x100 feet, and will cost about \$10,000. A large addition is also nearing completion, and the National output next season will be 600 cars.

W. W. Ker will give a series of public lectures on automobile subjects at the Hebrew Technical Institute, 36 Stuyvesant street, New York, as follows: November 22, "The Gasoline Automobile—Part I"; November 29, "The Gasoline Automobile—Part II"; December 6, "The Gasoline Automobile—Part III"; December 13, "The Electric Automobile."

The big carriage manufacturing concern of Racine-Sattley Company, Racine, Wis., is again said to be contemplating the addition of an automobile plant. Some time ago it was said that a car manufactured in

St. Louis would be built at Racine in the future, but it is supposed that the deal fell through. H. E. Miles, founder of the company, retired some weeks ago, and George H. Yule, of Kenosha, one of the owners of the Badger Brass Manufacturing Company, was named president.

A number of prominent automobilists in Washington, D. C., have organized the District of Columbia Good Roads Association, having for its object the improvement of the old stage road from the capital to Leesburg, Va. The project has met with favor among the farmers in the sections through which the road passes, and wealthy men who have residences nearby have promised to subscribe to a fund to defray the expense.

#### Club Notes.

The Florence (Col.) Motor Club has been organized with the following officers: W. E. Mitchell, president; Dr. L. E. Rupert, vice president, and E. F. Jack, secretary and treasurer.

An automobile club has been organized at Ocala, Fla., and the following temporary officers have been appointed: Edward Holder, president; Emmett E. Robinson, secretary, and David S. Woodrow, treasurer.

The Philadelphia A. C. plans to introduce a chauffeurs' employment bureau, keeping on hand a list of chauffeurs looking for positions, with their records, for the use of members of the club who desire to engage drivers.

The St. Paul (Minn.) A. C. has closed its summer clubhouse at the Anchorage on the St. Croix for the summer. The clubhouse and the roads in the vicinity will be improved at considerable expense for next season.

The A. C. of Philadelphia held its regular monthly meeting on November I, and elected twenty-eight new members, bringing the total up to 980. The touring information committee reported that it has published six road map sections to date.

It is reported that the Boston Motor Club, which was organized after the Boston show last spring as a result of dissensions among the members of the Bay State A. A., will pass out of existence, a proposal having been made to its members to join the Bay State A. A.

At a meeting of the contest committee of the Hartford (Conn.) A. C. on October 29 plans for an all Connecticut endurance contest to be held between May 15 and June 15, 1910, were discussed. The course will lead through practically every city of importance in the State. A technical examination of the cars both before and after the contest is contemplated. The contest committe of the club consists of Hiram P. Maxim, C. H. Gillette, H. W. Nuckols,

Albert M. Kohn, Samuel A. Miner and William C. Russell.

The Pittsburg (Pa) A. C. last week entertained about 200 township commissioners and road supervisors at its clubhouse, and paid bonuses offered by it for the use of the King road drag for the improvement of dirt roads. The first prize of \$100 was awarded to John Kirk, Broughton, Snowden Township.

Dr. J. F. Schreiber has been appointed chairman of the racing board of the Milwaukee A. C. President Clarke S. Drake has appointed James T. Drought, secretary of the Wisconsin State A. A., chairman of the committee on legislation, together with State Senator Julius E. Roehr, Alonzo Burt, George A. West and Emil O. Hoffman.

The Franklin County Automobile Association was organized in Greenfield, Mass., recently, with the object of promoting the improvement of roads in the county. The organization starts with about 100 members. The following officers were elected: Rev. C. W. Merriam, president; Dr. J. C. O'Brien, vice president; A. B. Allen, treasurer, and Dr. E. L. Major, secretary and clerk.

The Portland (Ore.) A. C. has received a shipment of road signs, which were erected along the different roads radiating from Portland last week. The signs consist of 36x5 enameled steel panels, with sharply contrasting figure on colored backgrounds. Signs of the same color will be erected along each route. The signs are carried on wrought iron standards 5 feet 6 inches high.

At its recent annual meeting the Hudson River Valley A. A., at Poughkeepsie, N. Y. elected the following officers for the ensuing year: Alva L. Peckham, Poughkeepsie, president; Rudolph F. Tompkins, Fishkill, first vice president; John Hopkins, Hyde Park, second vice president, Dr. J. W. Poucher, Poughkeepsie, third vice president; Charles G. Schwartz, Poughkeepsie, treasurer, and John J. Glass, Poughkeepsie. secretary. A motion was adopted in favor of the board of governors offering a reward for the apprehension of drivers who try to escape after injuring pedestrians. The authorities of Poughkeepsie will be urged to use less water in sprinkling the streets of the city, which are now so flooded as to be a danger to motorists.

#### Racing Notes.

The protest filed by the Atlas Motor Car Company, of Springfield, Mass., against the decision of Referee Wm. K. Vanderbilt, Jr., not to make an award in Class 2 of the Vanderbilt Cup entries has been rejected because it was not lodged within twenty-four hours as required by the rules, and, besides, the Atlas car had not completed the

prescribed twenty-two laps at the time the race was called off.

The Simplex car driven by George Robertson in his recent try-out on the new Speedway at Hopeville, Ga., has been purchased by Edward Inman, of Atlanta, and Robertson has been engaged to drive it in the events on the Speedway this week.

M. C. Moore, the newly elected president of the Wisconsin State A. A., is reported to be endeavoring to arrange plans for holding the Cobe Cup race on some circuit in Wisconsin next year. A circuit in the vicinity of Beloit has already been explored for the purpose. This year the race was held by the Chicago Automobile Club on a circuit in northern Indiana, but was not a success financially.

The Pope-Hartford car, driven by Jack Fleming, which won the free for all and the light car race in the recent Portola road races in California, was equipped with Fisk bolted on tires with Fisk removable rims. We are informed that three of the car's shoes were changed toward the end of the 258 mile contest as a matter of precaution, while one casing and its tube went through the entire race and finished in good condition.

#### Trade Personals.

WILL Soules, a well known racing driver, will have charge of the testing department of the Croxton-Keeton Motor Company, Massillon, Ohio.

CARL J. SIMONS, formerly manager of the Maxwell-Briscoe Kansas City branch, has accepted a similar position with the Dempster Machinery Company, who handle the Locomobile in Kansas City.

H. W. DOHERTY, whose resignation as sales manager of the Cameron Car Company of Beverly, Mass, we announced in a recent issue, has bought an interest in the Jordan Equitable Company, of Beverly, manufacturers of automobile accessories

STANLEY A. ALLEN, superintendent of the Packard Motor Car Company of New York, has resigned to become manager of Fickling & Co., succeeding C. R. Hough, who goes to Washington, D. C., to become sales manager of the Buick branch there.

C. H. TANGEMAN, president of the Hol-Tan Company, New York, who handle the Lancia car in this country, sailed last week for England, where he will visit the Olympia Show, and before returning will make a trip to the Lancia works at Turin, Italy.

JESSE FROEHLLICH, managing director of the Benz Auto Import Company of America, accompanied by Mrs. Froehlich, sailed for Europe yesterday on the Amerika of the Hamburg line. After visiting the Olympia and Stanley automobile shows in London, Mr. Froehlich will go to Mannheim, Germany, where are located the works of the Benz Company.

C. H. Tyler, who was formerly connected with the Studebaker Chicago branch, has been appointed manager of the electric pleasure vehicle department of the Studebaker Automobile Company, and will in

future have charge of all matters relating to electric pleasure vehicles, acting under the advice and counsel of General Manager Fames

#### New Incorporations.

The Only Car Company, Echo, L. I.—Capital stock, \$300,000.

The Lowell Auto Body Company, Grand Rapids, Mich.—Capital stock, \$30,000.

The Dixie Motor Car Company, Oklahoma City, Okla.—Capital stock, \$100,000.

The Toledo Motor Company, Toledo, Ohio, have increased their capital stock from \$10,000 to \$2,000,000.

Patton-Van Vliet Automobile Company, Des Moines, Ia.—Capital stock, \$20,000. Incorporators, D. T. Patton and G. Van Vliet.

The Vaughan Motor Company, Portland, Ore.—Capital stock, \$10,000. Incorporators, Walter H. Evans, Frank Carey and C. W. Vaughan.

Standard Motor Car Company, Spokane, Wash.—Capital stock, \$25,000. Incorporators, Frank W. Schultz, J. A. Stoner and M. E. Estep.

The Norwalk Consolidated Auto Company, Norwalk, Conn.—Capital stock, \$25,000. Incorporators, John W. Bull, Geo. N. Philbin and Theo. S. Glover.

Texas Motor Sales Company, Fort Worth, Tex.—Capital stock, \$20,000. Incorporators, H. E. Crowley, Ira W. Wood, K. O. Wright and B. K. Goree.

The Great Southern Automobile Company, Birmingham, Ala.—Capital stock, \$100,000. Incorporators, E. F. Enslen, Ike Adler, John Kyser and E. F. Enslen, Jr.

# Auspicious Opening of Atlanta Speedway—Records Fall.

The first day's events on the new Hopeville Speedway of the Atlanta Automobile Association on Tuesday proved a great success. In the presence of about 5,000 spectators Lewis Strang, driving the 175 horse power Fiat racer described on another page, established a new world's record for a two mile track, covering a mile in 0:37.7, which is equal to a speed of 95.5 m. p. h. This replaces the record established by Oldfield in a Benz racer on the Indianapolis track recently. Oldfield with a Benz made second best time in the time trials, viz., 0:40.13. While the time trials were perhaps the most interesting event of the day, a great deal of interest also attached to the 200 mile stock chassis race. This was won by Louis Chevrolet in a Buick, whose time was 2:46.48, which is equal to an average speed of 75.9 m. p. h. Both the second and third places in this race were secured by Chalmers-Detroit cars, driven by Dingley and Lorimer, respectively. The 10 mile stock chassis event for cars of from 451 to 600 cubic inches piston displacement was won by a National, driven by Aiken, in 8:27.22, and second place in the same race was also secured by a

National, driven by Kincaid, whose time varied from that of the winner by only a fraction of a second. The 10 mile race for light cars was won by Joe Matson in a Chalmers-Detroit, his team mate, Knipper, securing second place. In the to handicap race, the Marmon driver. Stillman who suffered bad luck in the recent Vanderbilt Cup race, was winner, he being allowed a handicap of 70 seconds. Stillman also took part in the 200 mile stock car race, and met with an accident on the eighty-fifth lap, which forced him to withdraw. This was the only mishap of the dav. The summaries follow:

One Mile Time Trial—First, Fist (Strang), 0:37.7; second, Benz (Oldfield), 0:40.13; think, Walter Christie, 0:43.82; fourth, Stearns (Ruberford), 0:50.35.

Ten Mile Stock Chassis, 451 to 600 cubic inches piston displacement—First, National (Alen), 8:27,22; second, National (Kincaid), 8:27,71; third, Apperson (Harding), 8:50.65.

Ten Mile Race for Light Cars—First, Chalmers-Detroit (Matson), 9:49.46; second, Chalmers-Detroit (Knipper), 9:49.84; third, Buick (Nelsa), 9:50.18. Also ran: White, gasoline; Fuller.

Ten Mile Free-for-All Handicap—First, Marmon (Stillman), 8:54.96; second, Harmon, (Harroun), 8:55; third, National (Aiken), 8:041. Also ran: Renault Frères, Rainier, Knox.
Two Mile Free-for-All—First, Fiat (Strag).

Two Mile Free-for-All—First, Fiat (Strang).
1:31.63; second, Benz (Oldfield), 1:37.18; third,
National (Aiken), 1:43.22. Also ran: Christie.
Two Hundred Mile Stock Chassis Race—First.

Two Hundred Mile Stock Chassis Race—First, Buick (Chevrolet), 2:46.48; second, Chalmer-Detroit (Dingley), 2:53.33; third, Chalmer-Detroit (Lorimer), 2:55.15. Also ran: Renault (Basic), Rainier (Marmon), Renault (Cliquoett), National (Aiken), National (Kincaid).

#### Rae Electric Vehicle Company Settles in Springfield, Vt.

The Rae Electric Vehicle Company have decided to locate in Springfield, Vt. The company have purchased 15 acres of land and will immediately begin the erection of two 200x50 foot buildings, which are expected to be ready for occupancy December 15. The officers of the company are H. K. Parkman, president; F. B. Rac. vice president; H. C. Welch, treasurer, and H. A. Bingham, secretary. Frank B. Rac, the inventor of the vehicle to be built, who formerly resided in Detroit, Mich., will have personal charge of the plant. The treasurer, H. C. Welch, is largely engaged in the shoe manufacturing. The first model to be turned out will be a runabout with double motor equipment, the motors being directly secured to the rear axle, with a guaranteed mileage of 90 on one charge of the batter-

#### New World's Speed Records.

According to cable reports from abroad, Auguste Hemery, driving a new Benz racer, made five new world's speed records on the Brooklands track in England on November 8, as follows:

Flying Start—One-half mile, 0:14.08s (=127.82)
m. p. h.); one kilometre, 0:17.761 (=125.94)
m. p. h.).

Standing Start—One-half mile, 0:25.566 (=70.406 m. p. h.); one kilometre, 0:31.326 (=71.406 m. p. h.); one mile, 0:41.268 (=87.233 p. h.).

# The Horseless Age

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### The Elusive Five Hundred Dollar Car.

By A. C. Woodbury.

It is said that when R. E. Olds was doing his early automobile experimenting, nearly two decades ago, he had in mind the building of a car to weigh 500 pounds and sell for \$500. He found it impossible to construct a car, at least commercially, without considerably exceeding his specified weight, and he sold few if any cars in those days for less than \$650. Since then there have been many who have sought to build cars to sell for \$500 or less, and to the lay mind it seems that a simple car could easily be built at that figure. Let us see what the history of the \$500 car has been.

#### HISTORICAL RESUME.

Several \$500 cars were placed on the market in 1904 and 1905. Probably the leading ones were the Pope-Tribune and the Gale. The little one cylinder Pope-Tribune seems never to have achieved great success on the road, and the Hagerstown plant which was devoted to its manufacture was turned over to the construction of two and four cylinder cars of greater cost. The conclusion seems to be warranted that the car was inadequate. The Gale car was made by the Western Tool Works, Galesburg, III., and was built on the lines of the so-called standard American runabout of the day. It was seen little, if at all, in the East, and I can say nothing about its quality or success, but the company has since turned its attention to the making of larger cars, to its exclusion. In passing it may be noted that the price of this car with double tube tires was \$550.

In 1904 it was announced that the Ford Motor Company would soon bring out a four cylinder runabout to sell at a price from \$400 to \$500. The price of \$500, with single tube tires, was announced at the time of the exhibition held in New York by the unlicensed automobile manufacturers in January, 1905. In order to get double tube tires \$50 extra must be paid, as was the case with the Gale car as noted above. After some months it was found that nearly everyone required the double tube tires, and the price of the car was advanced to \$600 with double tube tires and perhaps some minor improvements. So this car passes out of the class under consideration.

The Brush runabout came on the market in the season of 1907. It was an honest attempt to reduce the automobile to about its simplest elements without excess weight or excess power, and to build well what there was of it. The price was \$500 with solid tires, for which the car was specially designed, and \$550 with pneumatic tires. It appears that pneumatic tires have been most called for, as the economy of solid tires seems to be very doubtful, and the 1910 announcements of the Brush Runabout Company make no mention of solid tires, but the price with pneumatic tires is reduced to just a little less than \$500.

The announcements of 1909 automobiles were marked by news of the entrance of three important firms of several years' standing in the industry into the \$500 class. Mr. Olds had at last placed on the market a \$500 car which was practically the same as the single cylinder Reo car for 1908, costing \$650, but I will not say that he has not changed his ideal as to weight from the 500 pounds of early days. So far as I know, this car will be continued for 1910 at the same price. The second new \$500 car was a smaller edition of the two cylinder Maxwell runabout, which had been on the market for several years. This was fitted with a smaller engine and smaller wheels than the regular Maxwell runabout, and was smaller in general, but was built along the same lines. The 1910 announcements of the Maxwell-Briscoe Motor Company indicate that this car is to be equipped with a magneto next year and the price is to be increased to \$550, while the larger two cylinder runabout is to be dropped. So, strictly speaking, this car also passes out of the \$500 class, but as the magneto might possibly be classed as extra equipment we will perhaps strain the point a little to keep it on our list. The Holsman Automobile Company, Chicago, Ill. also reduced the price of their high wheeled car with plain buggy body to \$500.

There have been several other cars placed on the market for \$500 or less. The Jewel was powered with a small single cylinder, two cycle motor, and sold for \$500, with a plain piano box body, and for \$600 with stanhope body. I have never seen this car and know nothing of its performance, but believe it was made in some numbers by the Jewel Motor Car Company, of Massillon, Ohio, who now make a comparatively expensive car with four cylinder, four cycle motor. The Orient buckboard was brought out about six or seven years ago, and then consisted of little more than the engine of a motorcycle mounted on four wheels. with a clutch, a small seat for two, and a tiller in place of a handle bar. The tread was less than 50 inches, so it was not at all suited to country roads, where there is often no smooth surface but two tracks or ruts for the wheels, 56 or 57 inches apart, and a rough surface or single track between, where the horses travel. In following seasons the buckboard was fitted with a two speed gear (no reverse), and finally with a friction transmission gear, and a two cylinder V motor-still air cooled and uncovered-at the rear was given as an option while the tread and wire wheels remained the same, and the price was increased to \$425 or more with the two cylinder engine. The factory at Waltham, Mass., where this car was made, is now in the hands of the Metz Company, who make a car in some respects similar to the latest buckboards, but with an opposed engine under a hood in front, larger wheels and a real runabout body. This car is sold in a knocked down condition for \$378. While this is considerably less than the price of our title, it is probable that when the labor or cost of assembling, etc., is counted up the result will not be far from \$500.

There have been other motor buggies built at prices from \$500 down, some of them not even having pivoted front axles, but a steering wheel connected by a vertical post and chains to the front axle in place of the thills. This construction does not work so badly as one might expect, but my single experience with a car of this class does not qualify me to properly judge others which may be more successful. There is probably nothing wrong with the principle of a buggy type car, but large wheels and solid tires will not drive a car without some assistance from the engine.

We have briefly described eight cars which have been on the market for \$500. (The buckboard and the Metz plan car are not included in that number.) Of these only three are now on the market for that price and one with magneto for \$550, while the manufacturers of four of the number seem to have found it more profitable to manufacture cars of considerably greater cost, the cheapest being \$825 or more. I believe this includes every car which has been sold on the American market for \$500 or less in quantities sufficient to be worth considering, unless it be one or two makes of motor buggies. What is the reason that there are not more? It surely is not because no one wishes to buy cars at that price-witness the quantities in which several of these have been sold. It must be that it is a much more difficult matter to design and build a really useful and satisfactory car at so low a price than would appear on the surface. That low priced cars can be built to the best advantage in large quantities only will be conceded by everyone, so it is harder for any new concern to get to the point where profits may be realized in the manufacture of moderate or low priced cars, while without large capital it might be impossible to push the sale of a very low priced car to the point where the quantity produced would insure a profit.

#### DEVIATION FROM STANDARD PRACTICE.

It will be noticed that each of the successful \$500 cars has in some way broken away more or less from the accepted practice in more expensive cars. In the Brush car a smaller engine is used than in any of the more pretentious American cars of the present day, and the whole car is made light in proportion. Also, the combination of spring suspension, distance rods and chain drive is probably cheaper to manufacture than the more standard constructions, and some instances of combination of functions in a single part are to be observed. In contrast to this note the four cylinder engine of the Ford runabout. It is perhaps not to be wondered at that the manufacturers of this car found it necessary, or at least expedient, to first reduce the agents' discount and then raise the price progressively. The Reo car is an example of simply reducing the cost of manufacturing in quantities, a car of the general type which was formerly popular at prices of from \$650 upward, but has now been rendered nearly obsolete by the demand for the smoother action and more power generally obtained by increasing the number of cylinders. It is nevertheless a type which has its advantages, and does not deserve to be discarded, because of its simplicity and directness. In the Holsman machine the economy comes in the air cooled engine of the simplest possible design for two four cycle cylinders, the substitution of two chains with only four sprockets, a jaw clutch and a type of belt drive, for the ordinary transmission, clutch and driving gears, and the buggy construction of the body at least of this simplest car must be cheaper than of most automobile runabouts. It may seem that the Maxwell is an exception to this rule of special design to reduce the cost, but at least the car is made smaller and lighter than any of the more expensive runabouts with resulting reduction in the cost, notably of the tires. It is also to be noted that the price has been raised above the \$500 figure.

#### THE TWO CYCLE CAR.

It is to be wondered at that the two cycle engine, which made possible the practical low cost motor boat, has been so little in evidence upon low cost automobiles. In its simple forms it would have the advantages, as compared with a four cycle engine of the same number of cylinders and

the same power, of lower manufacturing cost, owing to the absence of the valves and their actuating mechanism, more even torque, easier cooling, in spite of the general impression to the contrary. In the two cylinder form the cylinders may be vertical instead of opposed, and the system of mixing lubricating oil seems to be thoroughly practical and less expensive in first cost than any other method of engine lubrication. The item of more even torque alone is of great importance, for the "jerky" action of the single cylinder four cycle engine under some conditions was undoubtedly one of the chief reasons for its being so generally abandoned. It can also be conceived that the facility with which a two cycle engine may be reversed might make it unnecessary to provide a geared reverse if the ignition and engine control were arranged with that in view.

The reasons which have prevented the more common adoption of the two cycle engine for this service seem to be somewhat as follows: The engine which first made the gasoline automobile possible was the light, high speed Daimler type. The two cycle marine engine was not at all suitable because of its low speed and heavy, clumsy construction. It is little if any more difficult to make a two cycle engine of light design than to make a four cycle engine so, but when it came to increasing the speed more difficulties were encountered, first with the cylinder ports, which had to be more ample than the marine engine makers of that day ever dreamed of, then with the crank case inlet. The "mixing valve" or "generator valve," usually consisting simply of a brass check valve provided with a small hole in its seat for the entrance of gasoline when the valve was opened by suction from the crank case with a needle valve to regulate the amount of gasoline fed, proved entirely inadequate. The three port type of engine, probably the simplest and cheapest practical form of gasoline engine to manufacture, can be so designed as to be quite suitable for comparatively high speed, but is hard to supply with a suitable mixture for variable speed unless the engine has four or more cylinders so as to make the suction on the carburetor more nearly constant. Any form of mechanically operated inlet valve, even discs on the crank shaft, is bound to add materially to the complication of the two cycle engine, and thus to discount one of its main advantages over the four cycle engine. It seems to me that the real solution lies in the direction of an automatic crank case inlet valve, although many of these are either so clumsy as to be ill suited for high speed or so delicate as to be liable to derangement, and perhaps expensive to produce. However, there are some in use which are both rugged and responsive. Also, the combination of an automatic inlet valve, to allow the engine to draw on the carburetor while the piston is going up, with a third port, to allow the crank case to fill, even if the valve is sluggish, has been used and is thoroughly practical. Another reason for the slowness of both manufacturers and purchasers to adopt the two cycle engine may be called either conservatism or prejudice. The four cycle engine was developed to a usable state for automobiles first, and there have undoubtedly been some attempts to adapt two cycle engines which did not meet with great success. Consequently many purchasers are doubtful about the wisdom of buying "two cycle experiments," and most manufacturers have been too busy making cars which they knew they could sell to spend much thought or money on what they may admit to themselves might have advantages.

#### SIMPLE BODY CONSTRUCTION.

One more simplification which would seem quite practical for a cheap car is the building of the chassis frame in such a form that the mere addition of the floor boards, dash and one or two seats would complete the body. The "democrat wagon" style of body would seem well suited for this purpose.

I believe that in a few years the \$500 car will be an immense factor in the automobile business. It is a branch of the industry which has barely been touched upon as yet, and the man who will do successful work along this line of reducing the automobile to its simplest form so as to make it available to the thousand dollars a year man may not only obtain financial reward but may become a real benefactor of his fellow men as well.

#### A Remedy for Fierce Cone Clutches.

There are few things more annoying to the average motorist than a harsh or grabbing clutch, especially in driving through heavy traffic in the city, where a great many stops have to be made.

Although some manufacturers seem to have solved the problem satisfactorily, the writer has, during several years' experience as a repair man, found a large number of the leather faced cone variety which gave trouble right from the beginning, and no amount of spring adjustment or soaking in different kinds of oil would remedy the trouble.

I recently tried inserting small strips of ordinary sheet tin or copper under the leather, and it has remedied the trouble in every case. The strips of metal should be cut about three-eighths of an inch wide and half an inch longer than the width of the clutch. They should be inserted under the leather and the ends bent over the metal part of the clutch to hold them in place. About four strips, spaced equal distances apart, are usually sufficient to give good results.—G. A. Marquards.

The Paris publication L'Auto is organizing an endurance contest for small cars, which is to be run December 5-19. Already twenty-six entries have been received, practically all of them from French manufacturers.

### Calculation of Chassis Springs—III.

#### By David Landau and Asher Golden.

DETERMINATION OF THE NUMBER OF LEAVES AND THEIR THICKNESS.

After knowing the flexibility required in any given case the next important step in the design of a spring is to find the number of leaves and their thickness.

For this purpose, it is convenient to regard the spring as being made up of two cantilevers, each taking half the load. The advisability of treating the spring in this manner will appear from the great number of actual cases in which the springs are eccentrated. Here the spring consists of two "halves" of unequal length. If the load is taken to be the same at each end, then the flexibility of each "half" of the spring must be the same in order that the deflection of both ends may be the same under the same loads. In practically all cases, however, the loads at each end are not the same; it is then necessary to take each "half" of different flexibilities in order that, as before, the deflection of both ends may be the same under the different loads.

Of course, an eccentrated spring may be treated as an eccentrically loaded beam, but we believe it is far simpler to treat it as being made up of cantilevers, whether it is eccentrated or not.

It is evident from what has just been said that when we speak of the flexibility of a spring we mean the "total flexibility," which is made up of two partial flexibilities, and it is necessary to find these partial flexibilities to get the total. It will suffice for all practical cases, however, whether the spring is eccentrated or not, to assume a single flexibility for the whole spring, then make the leaves slightly thinner on the side sustaining the smaller load.

The maximum deflection of a cantilever of uniform section with a single concentrated load at the free end is

If the cantilever consists of n leaves all of the same thickness the deflection is

$$d = K \frac{P l^3}{3 n E I} \dots (16)$$

where K varies between 1.2 and 1.5. If the n leaves have the same width but different thicknesses and the moments of inertia of these leaves are I<sub>1</sub>, I<sub>2</sub>,.....I<sub>n</sub>, then

If in equation (17) we take the total load on the spring to be 100 pounds, that is, 50 pounds on each end, we have the deflection of the spring per 100 pounds. This is defined as the flexibility and is denoted by the letter f. Equation (17) may then be written

. The moments of elasticity, E I, may be easily found for plates of different widths and thicknesses and arranged for convenience in a table. It is then only necessary to know the flexibility required for any given case, substitute it for f in the following equation and pick out such leaves,

Substituting these numbers in equation (19), we have

$$\Sigma$$
 (E I) = 1.3  $\frac{50 \times 20^8}{3 \times .25}$ 

== 603000

We will assume that the spring is to be made of the steel having the modulus 28,-

TABLE II.

MOMENTS OF BLASTICITY BASED ON E = 28,000,000

Stub's	Thick-			Wi	WIDTH OF LEAVES IN INCHES											
English Gauge	ness. Inches.	13	19	2	23	23	. 29	3	37							
0000	.454	328000	889000	437000	492300	546000	601000	656000	711000							
000	. 425	268000	818000	858000	403000	447500	492500	587000	581500							
00	.380	192000	224000	256000	288000	320000	352100	884000	416100							
0	.340	137500	160400	188300	206000	229100	252100	275000	298000							
1	.800	94500	110000	126000	141800	157500	178000	189000	204100							
2	.284	80150	93500	100900	120200	133600	147000	160200	178800							
3	. 259	60800	71000	81000	91250	101400	111500	121500	181800							
4	.238	47250	55100	63000	70900	78750	86600	94500	102300							
5	.220	37380	43500	49750	56000	62200	68500	74600	81000							
6	.208	29300	84200	39100	44000	48900	53750	58600	68400							

the sum of whose moments of elasticity shall be equal to  $\Sigma$  (E I).

$$\Sigma (E I) = K \frac{50 \, I^3}{3 \, f} \dots (rg)$$

We have prepared tables II and III of moments of elasticity for leaves of widths and thicknesses usually employed for springs and for moduli of elasticity of 24,000,000 and 28,000,000, representing, respectively, an ordinary carbon spring steel and a high grade alloy steel.

As an example in the application of the above tables and equation (19), let it be required to select the leaves for a spring having the following dimensions and characteristics:

	Inches.
Length under load	. 40
Half length	. 20
Width of leaves	. 2
Flexibility	25

000,000. Looking, therefore, in the first table, under the head 2 inches, we pick out such numbers whose sum will approximate 693,000. We thus find

1	leaf of	No.	I	gauge,	EI =	126,000	126,000
3	44	No.	2	44	EI =	106,900	320,700
I	**	No.	3	"	EI =	81,000	81,000
2	**	No.	4	44	EI =	63,000	126,000
:	**	No.	6	46	EI =	39,100	39,100
							602.800

#### FORM OF THE LEAVES.

We do not think we can add much to what has already been written on this subject. There are, however, a few points about which little, if anything, has been said.

The bending moment at any point of a cantilever is directly proportional to the distance of the point from the free end. If  $M_h$  is the bending moment and Z the

TABLE III.

MOMENTS OF ELASTICITY BASED ON E = 24,200,000.

Stub's English	Thick-			Wii	WIDTH OF LEAVES IN INCHES.												
Gauge.	ness.	13	12	i 2	23	21	29	3	32								
0000	.454	283000	330600	877700	425000	472000	519000	567000	614000								
000	.425	232000	270200	309200	348000	896000	425000	465000	508060								
00	.880	166000	194000	. 221600	249000	276000	804000	882000	859600								
0	.840	119900	188500	158500	176000	198000	218000	237900	258000								
1	.800	81600	95000	109000	122800	136200	149800	168500	176500								
2	.284	69600	80900	92500	104000	115500	127600	188600	150200								
8	.259	52600	61400	70000	79000	87600	96500	105000	114000								
4	.238	40800	47700	54500	61250	68000	74800	81700	, 88500								
5	.220	82300	87600	43000	48400	587 <i>5</i> 0	59250	64500	70400								
6	.203	25380	29600	33900	39000	42250	46500	50750	54800								

section modulus at any point, then the fibre stress is

$$S = \frac{M_h}{Z} ,$$

from which we see that for a cantilever of uniform section the fibre stress is proportional to the bending moment, and therefore the distance from the free end. We can get a uniform fibre stress, that is, uniform strength, at every section by making the section the least at the free end and gradually increasing it as we go toward the point of maximum moment, that is, the spring seat. With other parts this is easily accomplished by means of webs or other forms of compression members. method cannot be practically applied to a spring; but, owing to the fact that the spring is built up of layers, it is only necessary to step these to gain the desired end.

It must be remarked that every separate leaf, as well as the entire spring itself, is also a cantilever subject to the same laws, and should be constructed so as to be of uniform strength. This is done by making the leaves thickest at the spring seat and gradually thinning down toward the spring eye. The thickness of the leaf at the spring seat is that selected from the tables of moments of elasticity. The thickness of the leaf at any other point may be found as fol-

The fibre stress at any section of the leaf is

$$S = \frac{M_b}{Z} = \frac{M_b}{\frac{I}{v}}$$

where y is the distance from the neutral axis to the outermost fibre. Since for uniform strength S is to be constant, the ratio

1/y must be proportional to Mb. Now, since  $1/y = \frac{b t^2}{6}$ , we have

$$M_b = \frac{S_b \ell^2}{6},$$

from which it is seen that  $b t^2$  must be proportional to Mb.

The bending moment at any point of a cantilever distant x from the free end is Px, where P is the load. We therefore

$$P x = \frac{S b t^2}{6}$$

or, since the width of the leaf is constant, the thickness of the leaf at the point x is

$$t = \sqrt{\frac{6 P x}{S b}}....(20)$$

There are many instances where the leaves are not made of uniform strength. In such cases the material is not used to

TABLE IV.—Maximum Safe Deflectionsof Springs for an Elastic Elongation of .00285, Corresponding to an Elastic Limit of 80,000 Pounds Per Square Inch.

Thickness of Master						]	DEVELOP	PED LENG	TH OF	MASTER	Leaf.						
Leaf. Inches.	30	31	32	İ	22	34	35	36	<b>3</b> 7	**	29	40	41	42	43	44	45
.454	1.41	1.50	1.61		1.71	1.81	1.92	2.04	2.15	2.26	2.38	2.51	2.63	2.76	2.90	3.04	3.1
.425	1.51	1.61	1.72		1.82	1.94	2.06	2.18	2.30	2.42	2.55	2.68	2.82	2.95	8.10	3.25	3.3
.890	1.69	1.80	1.98		2.04	2.17	2.30	2.43	2.57	2.71	2.85	8.00 ,	8.15	3.31	3.47	8.68	8.7
.340	1.89	2.01	2.15	. :	2.28	2.42	2.57	2.72	2.87	8.03	8.19	3.36	3.52	8.70	3.88	4.07	4.2
.300	2.14	2.28	2.43		2.58	2.74	2.91	3.08	3.26	3.42	8.62	8.81	4.00	4.19	4.40	4.60	4.5
.284	2.26	2.41	2.57		2.78	2.90	3.08	8.25	8.48	3.62	3.81	4.01	4.22	4.43	4.64	4.85	5.0
.259	2.48	2.64	2.82	1 1	2.99	3.18	8.37	3.57	8.78	3.98	4.18	4.41	4.68	4.86	5.10	5.36	5.5
.238	2.69	2.87	8.06		3.28	8.46	3.67	3.88	4.11	4.88	4.56	4.80	5.03	5.29	5.55	5.82	6.0

TABLE V.—For an Elastic Elongation of .00465, Corresponding to an Elastic Limit of 180,000 Pounds Per Square Inch.

hickness f Master					T.	EVELOPI	d Leng	тн ог Х	IASTER I	LEAF.						
Leaf. Inches.	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	4
.454	2.81	2.46	2.62	8.79	2.96	3.14	3.32	8.50	3.60	3.88	4.07	4.30	4.50	4.78	4.94	5.1
. 425	2.46	2.63	2.80	2.98	3.16	8.35	3.54	8.78	3.98	4.15	4.37	4.57	4.81	5.05	5.27	5.5
.380	2.78	2.94	3.13	8.33	8.54	8.74	8.96	4.18	4.43	4.64	4.89	5.14	5.39	5.64	5.92	6.1
.340	8.08	3.28	3.50	3.72	3.95	4.18	4.43	4.67	4.92	5.20	5.46	5.72	6.02	6.82	6.63	6.
.300	3.49	3.72	3.97	4.22	4.48	4.74	5.02	5.31	5.58	5.90	6.20	6.50	6.82	7.17	7.50	7.
.284	3.68	8.94	4.19	4.46	4.74	5.01	5.30	5.60	5.92	6.22	6.55	6.88	7.22	7.58	7.95	8.
. 259	4.04	4.32	4.59	4.88	5.19	5.50	5.81	6.17	6.50	6.85	7.22	7.56	7.95	8.32	8.74	9.
.238	4.39	4.70	6.00	5.82	5.65	5.98	6.83	6.70	7.05	7.48	7.82	8.22	8.62	9.05	9.47	9.

TABLE VI.—For an Elastic Elongation of .00645, Corresponding to an Elastic Limit of 180,000 Pounds Per Square Inch.

Thickness of Master Leaf.					Г.	EVELOPE	D LENG	rh of N	[ASTER ]	LEAF.						<u>`</u>
Inches.	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
. 454	8.20	3.42	3.64	8.87	4.14	4.36	4.60	4.87	5.14	5.40	5.68	5.98	6.26	6.57	6.90	7.1
.425	3.41	3.65	8.98	4.14	4.42	4.65	4.92	5.18	5.46	5.76	6.06	6.88	6.68	7.00	7.85	7.6
.380	8.82	4.08	4.34	4.52	4.94	5.20	5.50	5.80	6.12	6.42	6.78	7.12	7.49	7.82	8.22	8.5
.840	4.27	4.56	4.85	5.17	5.52	5.82	6.15	6.50	6.85	7.22	7.58	7.95	8.35	8.77	9.20	9.1
.300	4.84	5.17	5.50	5.86	6.26	6.59	6.97	7.88	7.78	8.17	8.62	9.06	9.50	9.95	10.42	10.8
. 284	5.12	5.46	5.82	6.19	6.62	6.96	7.36	7.80	8.20	8.63	9.07	9.55	10.00	10.50	11.00	11.4
.259	5.60	5.90	6.39	6.79	7.25	7.63	8.07	8.54	9.02	9.50	10.00	10.45	10.95	11.50	12.10	12.
.238	6.09	6.51	6.93	7.87	7.90	8.81	8.78	9.80	9.82	10.80	10.80	11.35	11.90	18.50	18.10	18.

the best advantage. While it is true that some strength is added to the spring if the leaves are not thinned down, the added strength is gained at the expense of too much material.

MAXIMUM DEFLECTIONS TO WHICH SPRINGS
MAY BE SUBJECTED WITHOUT TAKING
A PERMANENT SET.

In the early part of this article we quoted one manufacturer as saying that he does not know the elastic limit or the tensile strength of the material he uses. We are told, moreover, that these characteristics do not necessarily give assurance against settling or breakage. This is erroneous. Knowing the elastic limit of the material certainly does enable us to determine under what conditions the deflections of a spring cease to be proportional to the load. If a beam or cantilever be subjected to

bending the skin in tensions will be stretched a certain amount, which we call the elastic elongation. This elongation, e, is expressed by the relation

$$e = \frac{a}{\kappa}$$

where a is the elastic limit of the material and E is the modulus of elasticity. For spring steels, the amount of stretching is found to be between .003 and .907 of the initial length.

The maximum safe deflection of a cantilever consisting of a spring leaf of thickness t is

where s is the developed length of the master leaf; from equation (21) we see that the maximum deflection is proportional to the elastic elongation. By maximum safe de-

flection we mean the distance through which the leaf or spring will move without taking a permanent set. After we have passed this point the spring will settle; hence the assurance that the elastic limit gives no indication of the susceptibility of the spring to settle or break is not borne out.

Once we have determined the elastic limit of our material we can employ equation (21) to construct tables showing the maximum safe deflections of spring leaves of different lengths and thicknesses.

As an example of the application of equation (21) we will take a spring having a developed length of, say, 36 inches with a master leaf .284 inch thick. Assuming that a has the value .004, we have by substitution:

$$D' = \frac{36^2 \times .004}{4 \times .284} = 4.28$$
 inches;

TABLE IV.—Maximum Safe Deflections of Springs for an Elastic Elongation of .00285, Corresponding to an Elastic Limit of 80,000 Pounds Per Square Inch.

Thickness of Master						DEVELOR	ED LENG	TH OF M	ASTER LI	EAF.					
Leaf. Inches.	46	47	48	49	_ 50	51	52	53	54	55	56	57	58	59	<b>80</b>
.454	3.81	3.46	8.61	8.76	3.92	4.08	4.24	4.40	4.57	4.74	4.91	5.10	5.27	5.45	8.64
.425	3.52	8.68	3.86	4.09	4.19	4.36	4.53	4.71	4.88	5.07	5.26	5.45	5.64	5.84	6.04
.390	3.97.	4.13	4.82	4.50	4.68	4.87	5.07	5.28	5.48	5.66	5.87	6.06	6.80	6.54	6.75
.340	4.48	4.62	4.81	5.01	5.28	5.45	5.67	5.90	6.12	6.84	6.57	6.81	7.05	7.80	7.55
. 900	5.02	5.26	5.47	5.70	5.94	6.18	6.42	6.68	6.95	7.17	7.46	7.78	8.00	8.27	8.50
. 284	5.29	5.56	5.77	6.02	6.27	6.52	6.77	7.02	7.80	7.57	7.87	8.15	8.48	8.73	9.27
.259	5.85	6.09	6.84	6.62	6.80	7.17	7.45	7.75	8.05	8.83	8.65	8.95	9.25	9.60	9.96
.238	6.35	6.62	6.90	7.20	7.50	7.80	8.10	8.44	8.75	9.05	9.48	9.75	10.08	10.45	10.80

TABLE V.—For an Elastic Elongation of .00465, Corresponding to an Elastic Limit of 180,000 Pounds Per Square Inch.

hickness f Master					<del></del>	DEVELO	PED LENG	тн ог М	ASTER L	EAF.					
Leaf. Inches.	46	47	48	49	50	51	52 ,	53	54	55	56	57	58	58	80
. 454	5.40	5.65	5.85	6.12	6.89	6.64	6.90	7.17	7.45	7.72	8.02	8.30	8.60	8.90	9.20
. 425	5.75	6.02	6.27	6.55	6.82	7.08	7.36	7.67	7.95	8.22	8.55	8.86	9.15	9.48	9.80
.390	6.47	6.77	7.04	7.32	7.13	7.95	8.25	8.47	8.92	9.28	9.60	9.95	10.25	10.65	11.00
.340	7.23	7.54	7.85	8.18	8.52	8.88	9.20	9.60	9.95	10.80	10.70	11.11	11.45	11.90	12.30
.300	8.22	8.56	8.90	9.80	9.70	10.10	10.50	10.90	11.30	11.70	12.20	12.60	13.00	18.50	18.90
.284	8.58	9.06	9.42	9.85	10.25	10.65	11.05	11.50	11.95	12.85	12.85	13.80	18.70	14.25	14.70
.250	9.55	9.95	10.40	10.80	11.30	11.70	12.20	12.65	18.15	13.60	14.15	14.60	15.10	15.65	16.8
.238	10.85	10.85	11.25	11.75	12.25	12.70	18.20	18.75	14.30	14.80	15.85	15.90	16.45	17.00	17.6

TABLE VI.—For an Elastic Elongation of .00645, Corresponding to an Elastic Limit of 180,000 Pounds Per Square Inch.

Thickness of Master						Develor	PED LENG	тн ог М	ASTER L	EAF.					
Leaf. Inches.	46	47	48	40	50	51	52	53	54	56	56	57	58	59	80
.454	7.53	7.84	8.15	8.58	8.87	9.25	9.59	10.00	10.85	10.70	11.15	11.60	11.90	12.30	12.7
.425	8.08	8.87	8.70	9.10	9.46	9.85	10.25	10.65	11.10	11.45	11.90	12.30	12.75	18.20	18.6
.390	8.95	9.37	9.72	10.15	10.60	11.00	11.40	11.90	12.35	12.75	18.30	18.75	14.20	14.70	15.2
.840	10.10	10.50	10.90	11.40	11.85	12.80	12.85	18.30	18.90	14.85	14.90	15.40	15.90	16.50	17.1
.800	11.40	11.90	12.85	12.90	18.45	13.95	14.50	15.10	15.70	16.80	16.90	17.50	18.00	18.70	19.4
.284	12.10	12.60	18.10	18.65	14.20	14.75	15.30	16.00	16.60	17.15	17.85	18.50	19.10	19.75	20.8
.259	18.20	13.75	14.20	14.90	15.60	16.20	16.80	17.40	18.15	18.80	19.60	20.20	20.90	21.70	22.4
.286	14.85	15.00	15.55	16.20	16.90	17.60	18.20	19.00	19.70	20.40	21.80	29.00	22.80	28.60	24.4

that is, if this spring is deflected more than 4.28 inches it will take a permanent set. In the manner here indicated we have constructed Tables IV, V and VI for different values of  $\alpha$ . It is clear that in any case the engineer will limit his deflections so that

they may be well within the values given in the tables.

(To be continued.)

# The Location and Standardizing of Cylinder Leaks.

By R. M. A. inders averaged evenly, so that such a

pressure was arrived at that showed but

slight variation on the gauge. Too low a

pressure must be avoided, since the rate

of filling the cylinder volume is a function

of the pressure, and with a large number

of cylinders much time would be consumed.

sents the orifice C, so that we may vary

this orifice to suit individual standards and

then remove the hand wheel to avoid tam-

pering. To the right of B is the factory

pressure and shut-off globe valve A; to

the left of B the low pressure gauge is con-

nected with a fitting allowing flexible con-

nections to be made to the cylinders. This

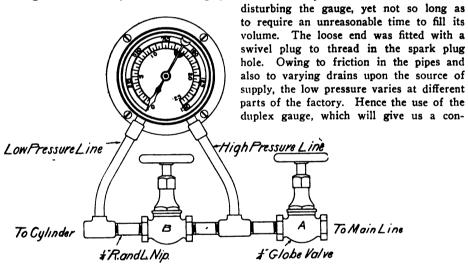
flexible connection was of suitable length

to reach all cylinders on a motor without

In the sketch the globe valve B repre-

We will deal with the leakage of compression in cylinders, and the determination of such leakage at valves, packing rings, etc., without involving the relation of piston stroke volume to clearance volume. To so relate a set of cylinders that they may be uniform in compression leaks is quite difficult without some recourse to accurate measurement which will tell when a cylinder is standard or not. Trying the cylinders of an engine by cranking each separately for its compression and then "swapping" the "weak" one of one engine for the "strong" one of another motor is depending too largely upon the personal equation.

The following principle and apparatus have given satisfactory results: Roughly



speaking, air flowing through an orifice C at one end of a short pipe will be greater in pressure in proportion as the second orifice Y, at the other end of the pipe, restricts the passage of this air. With the inlet C a constant, and Y a variable, the pressure will vary in the connecting pipe—assuming the volume of air behind C constant in pressure and infinite in volume—in proportion to the volume escaping at Y. We can easily fix these constants for our use and read the variable Y with a low pressure gauge.

Applying this to the cylinder, the sum of its leaks will represent Y, and when these are equal to C the gauge will show no pressure, etc.; Y in this case being small requires little pressure to give a sensitive appreciation of the presence of leaks. From 15 to 20 pounds has been found convenient. To obtain this, cylinders of a finished car were averaged by changing the opening in orifice C. To the hand crank these cyl-

stant standard. The high pressure calibrations were 0-150 pounds, and the low 0-125 pounds. Then with the main line at 90 pounds, and the reduced line taken as 15 pounds, the arrows are parallel. Any increase or decrease in leakage will affect but one arrow, and this variation is easily noted.

With the above apparatus one man can easily keep pace with the rest of the work on the motors, care being taken to have the amount of oil equal for all pistons, as well as to have the pistons at the same part of the stroke in each case, i. e., the top centre. For bench testing each piston, previous to being put into the cylinder, is dipped in a pan of oil to a given depth to insure a uniform oil packing around the rings.

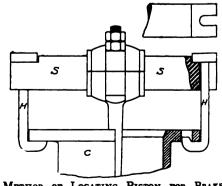
The second sketch is intended to convey a suggestion for accomplishing rapid change and insure constant position of the piston in bench testing. S is a shaft slotted

at both ends to receive hook clamps H H. This shaft is equal to the diameter of the crank pin, less one-thirty-second inch, and is hardened to avoid nicking, and thus scratching the bearing when drawn through. The hook clamps H H are of such length as to give the piston the same position as the stop centre. The hooked ends are relieved where they engage cylinder C, so that they may be drawn out of or put in the end slots of the shaft. It is apparent that the axis of shaft S is parallel to the diagonal of the bolt holes of the cylinder flange. We depend upon the rings to hold the compression, so the piston and its rings are inserted in their customary way, then the piston is turned through 45 degrees. Owing to their friction on cylinder walls the rings maintain their original location.

In the case of T and L head cylinders, by inverting the cylinder, as shown in the sketch, the valve ports are easily inspected. Soap and water are cheap, and if applied to the valves and the edge of the piston, while air pressure is turned on, will plainly show any excessive leakage.

The following experiments are of interest:

- (1) Determination of the curve showing the effect of "running in" the piston rings, the valves being ground before each test, and a given quantity of oil being injected into each cylinder to insure uniform packing.
- (2) In combination with such an average curve a series of tests (a) with different quantities of the same oil, and (b) with constant quantities of different oils, to determine the effect upon the valves when not ground after the run.
- (3) On model cars at intervals of a few days' run to determine the life of compression and frequency of grinding valves.
- (4) To determine whether a cylinder that has held good compression will continue to do so or not, and vice versa.



METHOD OF LOCATING PISTON FOR BRAKE
TEST.

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#### Ignition Terminology.

Recently the question was put to us, "What is the difference between a high tension and a low tension magneto?" and we were at a loss to give a concise answer, for the reason that there is one class of magnetos which is classed by some as a high tension and by others as a low tension device. The type referred to is, of course, that in which a low tension current is generated in the armature, which is "stepped up" by means of an outside coil and distributed to the different cylinders by means of a high tension distributor combined with the magneto. The manufacturers of this type of magneto generally refer to it as a high tension magneto, and the manufacturers of the other type in which a current of sufficient pressure to jump the spark plug gap is generated directly in the armature, in order to distinguish them from the first mentioned type often refer to them as true high tension or direct high tension magnetos. This terminology is evidently somewhat clumsy

and unsatisfactory. We would suggest the adoption of the following terms, which are herewith submitted to ignition specialists for criticism or adoption:

High tension magneto—a magneto generating in its armature a current of sufficient tension to jump the gap of an ordinary ignition spark plug.

Low tension magneto—a magneto generating in its armature a current of low tension adapted for use with a contact spark ignition system.

Low-high etnsion magneto—a magneto generating in its armature a low tension current and provided with a separate induction coil for raising the tension to that used in high tension ignition systems.

The novel ignition generator recently brought out in Springfield, Mass., which was described in one of our late issues, also calls for a new addition to scientific nomenclature. It is evidently a magneto generator, since it generates current mechanically by means of a magnetic field due to permanent magnets. In order to distinguish it from the revolving armature type of magnetos it might be well to refer to it as a drop armature type.

#### The Left Hand Control.

Quite a number of designers have always maintained that the left side of the car was the proper position for the driver. Although numerous early experimental cars were built with the control on this side, only a few makers have ever manufactured cars with left hand control in any considerable numbers. Last season, however, one of the leading makers adopted this position for the driver, and among the announcements of the past few months there is considerable evidence of a revival of interest in this style of construction.

Among the objections urged against the left hand placing of the driver are the alleged difficulty of judging the position of the curb when approaching it with the right hand side of the car, and of operating the hand levers. If these latter are placed upon the left side of the driver they must be operated by the hand which is the less skillful in the majority of persons. If they are placed in the centre of the vehicle there is danger of the operator's arm interfering with the other front seat passenger. It should be remembered, however, that the movements required in hand lever operation are comparatively simple, and a sufficient degree of skill is readily acquired.

As to the merit of the other objection,

we have talked with quite a number of drivers, and their opinion seems divided, some claiming that a car can be driven close to either curb with equal facility no matter which side the driver sits on, and others claiming quite the reverse.

A similar difference of opinion exists with regard to the advantages of the two positions when meeting another vehicle.

Probably the recent enforcement of the ordinances which require a vehicle to stop with its right hand side toward the curb has been one of the reasons for the renewed interest in left hand control. For as cars are made at the present time it is usually unhandy to enter or to leave the front seat from the driving side. This unhandiness could, of course, be largely done away with by the use of sliding or tilting steering wheels, but at the present time there seems to be no evidence that they will be adopted.

# The Atlanta Show from the Exhib- - itors' Standpoint.

While from the standpoint of gate receipts the late Atlanta Show perhaps did not come up to expectations, the majority of exhibitors considered it a success either from the standpoint of immediate business or from that of its advertising value.

It was the opinion of nearly everybody who had given the slightest thought to the matter that the comparatively small attendance was entirely due to the races, which certainly drew enormous crowds. Every day of the meet both the grand stand and the bleachers were at least three-quarters full, to say nothing of the large number of cars parked inside of the track. When it is stated that the grand stands and bleachers are of more than twice the size of those at the ordinary mile tracks it is readily realized what this means.

While this state of things was decidedly bad from the viewpoint of the show management, yet it may not have been an unmixed evil. There is little doubt that the exceedingly fine program of races at the track offered far greater attractions to persons only casually interested in automobiles and those who were simply in quest of amusement. On the other hand, those who came from some distance, as many undoubtedly did, to see the races would be almost certain to visit the show as well, and, of course, many of this class are likely to be either immediate or prospective buyers. It is probable, too, that the fact that the attendance was small and made up to a great extent of enthusiasts gave the salesmen and demonstrators a much better opportunity to give proper attention to prospectives. In a talk with the vice president of a leading company, a pioneer in the industry, this gentleman stated that he had seen more real automobile enthusiasm in Atlanta than he had seen in any other city in a long time. Going into particulars, he said that his company had sold five of their larger cars during the show, and that from what he had seen of the situation in the South the market there was about the same as it was in the North and East five years ago, and that the prospects of development were fully as promising. A local agent for a well known make of car stated that he had sold every car which he had on exhibition, as well as two others which had been shipped for the show, but which, owing to lack of space, he had kept at his showrooms. The only firm exhibiting foreign cars at the show said that they had sold two of their cars, and, considering everything, were well pleased with the results.

That business was not confined to any one class was evidenced by the fact that the exhibitors of the four lowest priced cars in the show were most enthusiastic in giving expression to their satisfaction.

The representatives of almost all of the motorcycle manufacturers, on the other hand, expressed themselves as being disssatisfied with the results of the show. They ascribed the lack of good results to two causes. The first, of course, was the counter attraction of the races, and the second was the fact that the location of the motorcycle exhibits was somewhat out of the way, and very little publicity was given by the local papers to this portion of the exhibit. That there was some truth in this would seem to be indicated by the fact that various parts and accessories exhibitors who were located in this portion of the building were not as well satisfied as others who had different locations. On the other hand, the representative of a well known car which was located in this section stated that his prospective business was very good, and that he had demonstrations booked into the middle of the following week, many of them being with people who had stopped over in town for that purpose. While none of the parts manufacturers expressed themselves as dissatisfied with the results of the show, yet they were not nearly so well pleased as the exhibitors of cars. This was only to be expected, as it is almost impossible to judge of the results of a show in this line, comparatively little business being done with the consumer direct, the business mostly passing through the agents of cars, and through garage and repair shop keepers. However, even in this line there were many who expressed their satisfaction in unmistakable terms.

The consensus of opinion seemed to be that in future, if the Atlanta Show should be repeated as a national show, it would be better to have no counter attraction in the way of races. Just what effect the show has had it will, of course, be possible to judge much better in the course of the next selling season, and the fate of this fourth national show will undoubtedly depend upon the development of the Southern market during the coming year.

#### New Jersey Vehicle Lighting Law Not Enforced.

Our attention has been called to the fact that the New Jersey vehicle lighting law, passed some months ago, is by no means generally enforced, numerous teamsters still continuing to drive after dark without displaying lights as required. The passage of the law was followed by considerable rejoicing among the motorists of the State, at whose instigation the bill was introduced, but if the benefits of the law are not to be lost it seems that immediate steps are necessary to urge its strict enforcement. Such a law on the statute books without being enforced is much worse than no law at all. as it gives road users a false sense of security in this respect. Motorists are interested most in the matter, as unlighted slow going vehicles are a great menace to the faster moving vehicles. New Jersey has a strong motorists' organization, which by inquiry among its members could easily obtain reliable information as to the extent the law is being violated, and a complaint lodged by the club with the authorities, if deemed necessary, would undoubtedly result in a stricter enforcement of the law.

#### Obituary.

E. Shriver Reese, who had been prominent in the affairs of the Cleveland A. C., died at that city on November 5, after an illness of two months. Mr. Reese was an insurance man and a native of Baltimore.

Robert H. Dowie, manager of the Seattle branch of the Fisk Rubber Company, at 910 East Pike street, died November 6 at Minor Hospital, where he had gone to be operated upon for cancer. Mr. Dowie was twenty-nine years old and one of the best known tire men in the Northwest.

#### Motor Buggies at the Atlanta Show, By C. E. D.

The display of motor buggies was, to say the least, disappointing. The South has been looked upon by many as the proper field for the large wheeled motor vehicle and it was expected that a goodly number of them would be seen there. Certain it is that the large wheels roll over the bad roads easier than small ones, and equally certain that the creeks and fords of the South often demand high wheels to carry the mechanism out of reach of the water. But another fact equally certain seems to not have been reckoned with. The public does not often do things in the most scientific manner nor does it always do the right thing. The pioneer automobile makers reasoned that the motor vehicle would be a development of the horse buggy, and found to their disappointment that the bicycle was regarded by the public as the father of the new industry, and such features as light, small steel wheels, bicycle chains and toy engines were among the first to find favor. The South is a new field going through much the same educative development, and if the show at Atlanta is any criterion they are making a similar although not the same mistake.

#### ATLANTA AUTO MAD.

Growing rapidly and making money iast. they have taken up the motor vehicle with a rush and an enthusiasm seldom or never seen equaled before. The newspapers in particular have been a unit in getting the new vehicle and the matter of good roads before the public. For this altruism they deserve a credit they will probably not get. In short, Atlanta is auto wild. In a city of 150,000 to 200,000 people are to be found about fifty sales agencies, each handling from one to four or five different makes of cars, and it is certain that the show will be the cause of several, if not many, more being established. Practically all of these handle the conventional type of cars, and the motor buggy type seems to be almost if not quite neglected. Naturally the agent prefers to sell to the wealthier class, and so selects a high grade article; but it is a very serious question if this trade will not soon be supplied and this business badly crippled by exhaustion of the supply of buvers.

#### HOPES FOR GOOD ROADS.

On every side is heard the argument that "good roads are at hand," but other communities have found that it takes years to make roads, and while for pleasure purposes a few good roads will serve, the demands of daily life require roads to be traversed that are not good and will not be for years to come. All these facts point to the motor buggy as the proper solution of the motor vehicle problem now being considered by the South. The roads need it, the people need it, and the dealers and makers of conventional cars will find it a step forward from the horse vehicle which many, not yet

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ready to buy conventional cars, could be induced to take, with the result that the sellers of conventional cars would profit in the future. The man who gets a taste of automobiling behind the lever of the light motor buggy is not likely to be happy till he twirls the wheel of the larger and more expensive car.

Today he sticks to the horse because he fears the complicated machinery, which, being a mystery, is fearful to him. He fears the tire troubles, which he does not enjoy overcoming himself. He fears the heavy weight, high maintenance cost and large fuel and oil bills. So the old horse and buggy will for him plod deliberately along for some years to come. But toward the motor buggy he feels differently. It looks familiar. He knows the life and strength of hickory spokes, long and limber enough to act as springs and largely save the vehicle by their resilience. He has seen hard tires in use for years and has no fears of them. He will consider a most simple mechanism if he can understand it and be much easier induced to buy than if brought a large structure which he does not understand. Once let him enter the ranks of the power propelled vehicle users and he is not likely to go back. He may, as do many doctors in some of the Northern cities, keep his touring car for pleasure and drive a solid tire rig for business, and even keep horses as a luxury, but he will not likely drop out of the ranks.

As for the buggies at the show, there were none. Makers who make and have heretofore shown them were there showing pneumatic tired rigs, but none of the buggy type with solid tires were to be seen. Whether they recognized the present as the time to sell the more expensive job, and so left the buggy behind, or whether they feel that their product is not wanted in or is not suited to the South, I do not know.

On the outside, two of the solid tire type were to be seen—one in the tent of the White Star Company, an Atlanta concern, who also exhibited conventional autos, and the other the Duryea Buggyaut, made at Reading, Pa.

The White Star motor buggy is a large, roomy affair, well built, and fitted with a 20 horse power, double opposed motor under the seat and planetary transmission, with Morse chain to the countershaft. Side chains from this carry the power to the wheels. Band brakes and magneto and battery form part of the fitting. Running boards and guards protect from mud perfectly. The impression is that of a solidly, even heavily built vehicle which should give good service. No demonstrations were given, and the selling efforts seemed to be confined to the conventional type autos also exhibited.

The Duryea Buggyaut has been described in these columns in the past. It is of very simple design, employing a two cycle engine with two cylinders nearly horizontal for better cooling and oiling. These cylinders are provided with copper spines which carry off the heat. The extended engine shaft ends carry rollers which frictionally engage rings carried by the rear wheels. These rollers and rings give two speeds forward and reverse, with all drives direct.

In the immediate vicinity of Atlanta, in Fulton County, there are several hundred miles of good or fairly good roads, and over these it is possible to travel at a good pace, but these are the exception rather than the rule. Georgia roads are being improved rapidly. The convicts are being put to work on the roads instead of being hired out to compete with honest labor in manufacturing or work of a limited amount. Their labor is being intelligently directed, with the result that some of the roads being built are models of engineering and worthy of imitation by the North. The expressions of the many visitors from all over the State, however, show that there is an abundance of sand in many parts, much mud and many obstructions, such as rocks and stumps. For such a condition the motor buggy is almost a necessity, and in spite of the failures of some of the cheaper and less well designed ones there is a big future for this type.

#### The Tent Shows.

Space at the main show was in considerable demand; in fact, quite a number of would be exhibitors who waited till the last moment were unable to obtain it. The White Star Automobile Company, of Atlanta, however, had secured considerable space, but seeing that they would crowd out visiting exhibitors they gave up the space and after renting a large plot of ground on Gillman street, within a stone's throw of the auditorium, put up a tent and opened a show of their own. They also took in one other belated exhibitor.

The Georgia Garage Company, on Edgewood avenue, put up a tent on a vacant lot adjacent to their quarters to accommodate any possible overflow caused by the visitors. In this tent were exhibits of the Gardner Engine Starter Company and of the Fellwock Auto Manufacturing Company. The Gardner Engine Starter Company showed a simple device for starting up small cars without cranking. A large flat spring is interposed between the two halves of the propeller shaft which is divided for the purpose. These two halves are ordinarily locked together by means of a dog clutch. When it is desired to start the motor, the high speed is thrown in and a special pedal is depressed. This latter disconnects the two halves of the dog clutch. The spring therefore acts and turns over the motor. As soon as the motor takes up its cycle the high speed is thrown out of action, the reverse is then thrown in. This latter action causes the motor to rewind the spring. As soon as the spring is rewound the machine will, of course, start to back. The pedal is then released and the two halves of the propeller shaft are again connected. The concern also exhibits a truss for strengthening

weakened rear axles, which is simple and easily applied.

The Fellwock Auto Manufacturing Company, Evansville, Ind., exhibited a line of metal rumble and surrey seats, which could be readily fitted to various runabouts not so fitted by the manufacturers. Among these are the Maxwell and Brush. They are made of metal and neatly upholstered. In addition to this line they also showed a line of wind shields with both brass and mahogany trimmings.

The White Star Automobile Company, of Atlanta, Ga., exhibited three machines with touring car bodies, one without a top and the other two with. This machine is equipped with a four cylinder motor having the cylinders cast separately, the exhaust valves in the heads and operated by rocker arms, and the inlet valves at the side and operated by push rods from underneath. The dimensions are 41/4x5 inches. Magneto ignition with Remy magneto is employed. The clutch is of the leather faced cone type. The transmission is of the three speed selective type with rocking lever and stubs. The wheel base is 110 inches and the tires are 32x31/2 inches. In addition to this they also have a high wheel solid tire buggy. This has 42 inch wheels and a wheel base of about 80 inches. The motor is a double opposed air cooled one, located under the body and driving the rear wheels through a countershaft by double side chains. This is accomplished by driving dogs on the rear axles which leave the wheels themselves so that they can be freely removed for greasing, as can be done with an ordinary buggy.

The Rohrbacher Automatic Air Pump Company, Blaine, Wash., showed their automatic air pump. This is a pump designed to be driven off of the flywheel by a friction pulley, being put into and out of action by a lever conveniently located. The pump is arranged so that there is a four to one reduction between it and the friction pulley, this reducing gear running in an oil tight casing.

Kelly in Control of Oscar Lear Company.

E. S. Kelly, of Springfield, Ohio, has secured control of the Oscar Lear Automobile Company of that city. An attempt was made by the General Motors Company to get control of this business, and it seems that they bought up a considerable proportion of the stock of the company, but last week Mr. Kelly got control of additional stock and is now in charge of the company's affairs. It is announced that the receivership will be lifted at once, and a complete reorganization carried through. The capital stock will be increased from \$200,-000 to \$500,000. The manufacture of pleasure cars will be discontinued, and the firm will confine itself to the manufacture of the air cooled Frayer-Miller trucks described in our issue of October 13, of which it is planned to turn out 400 during the coming year.

### DESCRIPTIONS OF NEW VEHICLES AND PARTS.

#### The New Brush Models.

During the past year the Brush Runabout Company, of Detroit, Mich., have followed their usual policy of carefully developing and testing out such changes as their experience leads them to believe desirable. As a result the models which they have just announced, while similar to this season's cars in general design, show a number of improvements.

Possible the most noteworthy of these is the balanced single cylinder motor. While the bore is 4 inches, as in former models, the stroke has been lengthened to 5 inches. This half inch increase in stroke considerably increases the pulling power of the motor, and probably gives greater maximum power. Possibly its less frequent and more powerful impulses might cause the car to vibrate unpleasantly if it were not for the unique balancing device which is used. A single cylinder motor causes a car to vibrate in two ways: First, by the up and down movement of its pistons. Second, by the reaction from its explosions,

To overcome this tendency to vibrate the Brush Company have added a counterweight on a revolving shaft just to the rear of the plane of revolution of the crank pin. A 6 inch gear is attached to the crank shaft, and the counterweight is placed inside the rim of a gear of equal diameter. Hence it revolves at the same speed as the crank shaft, but in the opposite direction. This movement causes it to balance practically all of the inertia of the reciprocating parts. At the same time, owing to its position with relation to the crank shaft axis, it makes the torque reaction practically uniform for the usual speeds of running. The counterweight shaft is mounted on a single New

Departure ball bearing. The gears are spirals, with a tooth angle of 15 degrees. The usual counterweights attached to the crank webs are, of course, employed. The writer intends to explain this method of balancing more in detail in another article.

The crank shaft is 13% inches in diameter, The connecting rod is an I section forging, are lubricated by gravity feed, which flows into pockets cast in the crank case, which lead to suitable oil holes. These pockets also catch some of the splashing oil and form an additional protection against running dry. Great care has been taken to make the motor oil tight. The screwed-in air cooled head, which has been character-



BRUSH MODEL D28.

with a hinged bearing at the crank end. The crank case is of cast aluminum, the general shape being globular. The rear bearing support is cast integral, but the front bearing and cam housing are carried on an attached plate. The valves are in front, both mechanically operated. They have a clear diameter of 15% inches. The counterweight is inserted, and the connecting rod bearing may be adjusted through a conveniently placed hand hole. The cylinders are lubricated by splash. Other parts

istic of the Brush since the beginning, has been retained.

Cooling is by water, using a Mercedes type radiator, with thermo-siphon circulation. The flywheel is 18 inches in diameter, and is slightly heavier than in former models.

Connection with the change gear is made through a shaft with two universal joints. These joints are fully enclosed. The change gear is practically the same as that used in this season's model. It is a two speed and reverse planetary of the internal gear type. The low speed and reverse clutches are now of the multiple disc type. They are bronze and cast iron, and differ from those formerly employed only by the increase in the number of plates, which doubles the wearing surface. The high speed clutch is also of the multiple disc type. Hardened steel and bronze are used to obtain a somewhat more compact clutch than would be possible with cast iron plates.

In the new transmission the operating levers for the low and reverse gears are entirely enclosed. Every precaution is taken against leakage, permitting the use of light oil.

A fifteen tooth bevel pinion on the change gear shaft transmits to a twenty-four tooth gear on the countershaft. Sixteen tooth sprockets on the ends of the countershaft are connected by side chains to the fifty tooth sprockets on the rear wheels.

The same axle construction is used as in former models, the body of the axles



BRUSH 1910 ROADSTER, MODEL D26, WITH PRESIDENT FRANK BRISCOE AT THE WHEEL.

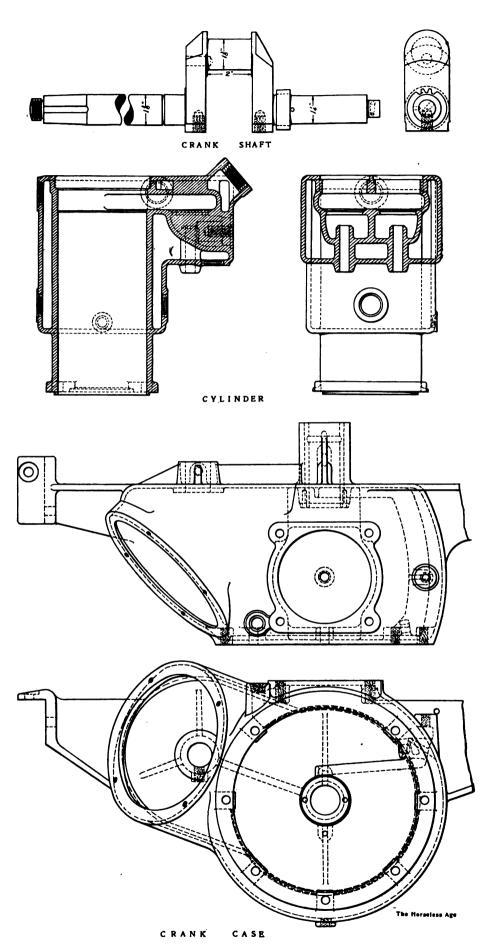
being of oil treated selected wood, while the wheels are mounted on suitable attached metal ends. The spring suspension remains as formerly. It consists of four helical springs set well out toward the wheels, whose vibration is damped by shock absorbers which serve as radius rods. A neat detail improvement in the suspension consists in a metal grease retainer over the ball end of the rod which connects the spring to the axle. The sockets for these balls are now lined with fibre. Oil treated wood is also used for the frame. The small parts of the running gear are mostly made from pressed steel, this material now being used in many places where castings and forgings were formerly employed.

Steering is by the well known Brush internal and spur gear combination. This is unchanged, except for slight alterations in the cases made necessary by the increased wheel base. A single hand lever controls the speeds, selectively, and a single pedal releases the clutch and applies the brakes. The brakes are of the expanding type and act on the wheel sprocket drums. Artillery wheels fitted with 28x3 inch pneumatic tires are used. It has been found that for this light car the pneumatic tires are very economical. The wheel base has been lengthened 6 inches, making it 80 inches. This increase in length allows more rakish body lines. The standard tread is 56 inches, but a 60 inch tread is furnished for the Southern trade.

As this car was designed to suit the needs of a wide variety of people, both for business and pleasure uses, several styles of bodies are fitted to this standard chassis. The regular body has a flat rear deck. A space for carrying tools is left under the seat. If slightly more carrying space is needed, the body known as D22 may be furnished. This has a large tool box at the rear, which may be used as an emergency seat. If a space is needed for larger articles the type D24 body may be used, which has a large carrying space covering the entire rear deck. This compartment is made tight by a removable steel cover. Model D28 is provided with a single rumble seat on the tool box for those who wish to handle a third passenger.

To meet the demand for a more speedy and racy looking car the Model D26 was produced. This car has a higher gear and is regularly equipped with a magneto, provisions for which are made on the other models. It has been found that there is a considerable class of users of small cars who wish to be more completely protected from the weather than is possible with an open body. For these the Model D coupé is provided. It has inside control and is finely finished.

Panhard & Levassor have decided to take up the manufacture of Knight slide valve engines in France. Mr. Knight has just returned from Paris after concluding arrangements to this end.



Motor Parts.

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### The K-R-I-T Models.

The Krit Motor Car Company, of Detroit, announce as their first productions a line of runabout and roadster models obtained by combining various bodies with a standard chassis. The car belongs to the moderate price class, and is unique for its simplicity of construction and control. It is shaft driven, has two speeds and a reverse obtained on the sliding system, and is powered with the popular type of four cylinder motor.

This motor has a bore of 3¾ inches and a stroke of 4 inches, and, as will be seen from the following description, is large enough to furnish ample power for the car. It is of the block type. All the valves are on the right hand side. Inlet and exhaust manifolds are cast separately to simplify the foundry work on the cylinder unit. They are attached in the conventional manner. The crank case is of the barrel type, with a liberal hand hole at the bottom for connecting rod adjustment. This opening is

This combination gives a powerful pressure on the discs, is self adjusting and may be operated by a very slight foot pressure. Small springs made integral with the discs hold them apart when the clutch is disengaged. A clutch brake is also provided.

The two speed and reverse sliding change gear is contained in a compact cone shaped case bolted to the flywheel case and forming the rear end of the power unit. The gears have wide faces. Direct drive is by an external internal gear clutch. The shafts are mounted on ball bearings. The shaft for the sliding pinions is provided with four feathers.

At the rear of the change gear case is a single universal joint; it is surrounded by a globe joint, which connects the propeller shaft housing tube to the frame. On the lower side of the case for the globe joint are two sockets which fit the ball ends of struts which connect with the outer ends of the rear axle housing. New Departure ball bearings are used on the inner ends

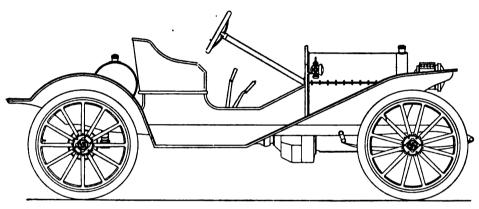
is given as 1,250 pounds. Two side and one tail oil lamps, a horn, tire repair outfit, and tool kit are furnished as regular equipment.

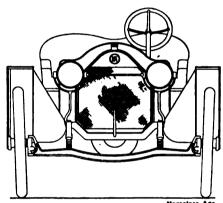
Three styles of bodies are furnished: A two passanger runabout, with tank on the rear deck, selling at \$800; a runabout body, with single rumble seat, at \$825; a surrey body, for four passengers only, at \$850. In the surrey both front and rear seats are divided, so only four passengers may be carried. This is done to prevent overloading, five or six passengers often being carried in cars with continuous seats which are intended for four.

#### Connecticut Master Vibrator Coil.

This type of coil is built on what is known as the master vibrator principle, using but one vibrator, which produces the electrical interruptions in the Rhumkorff windings.

With the ordinary type of spark coil, employing one vibrator for each coil, it is necessary to adjust each vibrator independently, and unless they are adjusted so as to





SIDE ELEVATION AND FRONT VIEW OF KRIT RUNABOUT.

closed by a sheet metal cover. The crank is of the two bearing type, large annular ball bearings being used. The crank pins are exceedingly liberal for a motor of this size, being 134x134 inches.

Cooling is by the thermo-siphon system, using a vertical tube radiator with continuous fins, and very large hose connections. The fan is 16 inches in diameter and is driven by a very wide, flat belt. It is mounted in such a manner that it may be raised to adjust the belt tension.

Ignition is by Bosch high tension magneto without spark advance. Lubrication is by splash. The flywheel is at the rear of the motor, and is fully enclosed. As it revolves it dips in an oil pool and carries the oil to the top of its case. From this point it flows into pockets cast in the crank case, and lubricates the various bearings. Cylinder walls are lubricated by splash. The breather pipe is attached to the case for the timing gears, and its action furnishes lubricant to their faces.

The flywheel contains the multiple disc clutch. This clutch consists of comparatively few discs of saw steel. They are pressed together by a 60 pound spring, which acts on a cone that communicates its motion through toggle levers to the discs. of the axle shafts and Hyatt roller bearings at the wheels.

The front axle is an I section drop forging, with Elliott type knuckles cross connected at the rear of the axle. The front wheels have cup and cone ball bearings. The front springs are nearly straight semielliptics. A single semi-elliptic spring, set crosswise, is used at the rear. It is placed in front of the axle with its ends linked to the brake housings, and its centre hinged to the rear cross member of the frame. The frame is of pressed steel, neither dropped nor narrowed. The power unit is supported at three points.

The driver's seat is on the left hand side. Steering is by an irreversible gear cross connected to the right knuckle. Gear shifting and emergency brake operation are by the usual hand levers, but the gear shifting lever is placed outside. The service brake and clutch are operated by a single pedal. The spark advance is fixed. The throttle is controlled in the usual manner. Both sets of brakes are of the expanding type, and operate directly on the rear wheels. They are fully enclosed.

The wheel base is 96 inches, and the tread is standard. The wheels are 32 inches in diameter, fitted with 3 inch tires. The weight

draw the same amount of current and are identical in construction and insulation, the results obtained from the different cylinders are anything but uniform. This condition is overcome in the master vibrator type of coil, for the reason that when the vibrator is adjusted to draw a given amount of current the adjustment is absolutely the same for all coils, with the result that uniform ignition is secured. It is claimed that the difference is so great in the majority of cases that it will be noticed immediately upon opening the muffler cut-out. It will be readily understood that there is but one vibrator to adjust.

On the top of each coil unit is located a cut-out button, the pressure of which will cut out any cylinder for testing purposes. In the individual vibrator type of coil the cylinders are tested by pressing down one or more vibrators, thus cutting off the spark. In the MV type this result is accomplished by means of the buttons above referred to. The master vibrator is so made that the contacts do not revolve in making adjustments.

The coil is made on the unit coil principle, and it is simply necessary to lift the unit from the case after removing the cover. which makes it exceedingly convenient in



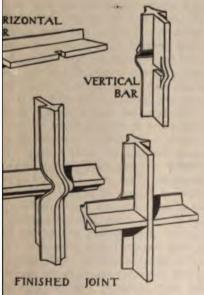
AASTER VIBRATOR CONNECTICUT COIL.

of test where it is desired to reverse of the units in the case. Each coil unit parated by means of a buckproof shield, h prevents the bucking effect due to age of current from one coil to any when the motor is pulling on a hill a heavy charge of gas. These coils manufactured under license of the Unit Company's patents, which are said to r unit, buckproof and master vibrator truction.

e vibrator unit is made in two styles, e and double. The accompanying ilation shows the double vibrator type, construction giving a spare vibrator h can be instantly brought into use by rsing the unit. Coils can be fitted with r plug, lever or magneto switch.

#### "Fenestra" Steel Sash.

me Detroit Steel Products Company, De-Mich., manufacture a steel window known as the Fenestra, which is pararly adapted for garages and factories, sash is made from special rolled stock material combining strength with weathesisting qualities, and is put together in interesting manner illustrated by the apanying cut. A small cross slot is in the vertical bar, only sufficiently to allow the flange of the horizontal to pass through; the molded portion is pressed out so as to fold closely around



FENESTRA STEEL SASH.

the molded portion of the horizontal bar. A small notch is made in the horizontal bar to act as a lock. It will be seen that in making one of these joints only a small amount of metal needs to be removed, and it is claimed that the section can be made much lighter than with a mitre joint. The peculiar section employed is claimed to insure 25 per cent. more light to a given opening than has been obtainable heretofore. The curved section is also claimed to give the sash a better appearance than that of the old mitre joint sash. The company have standardized the sizes of the sash for 10x16 inch and 12x18 inch panes. The use of these standards neither restricts the size of the window nor the percentage of ventilation which may be obtained from a given open-

#### The Foster Shock Absorber.

The Foster shock absorber is built so it acts free in the centre and binds gradually going up and coming down; it allows free play to the springs over smooth roads, and only takes effect where it is rough enough to be actually needed. The stationary base of the absorber consists of an oval shaped steel



FOSTER SHOCK ABSORBER.

cup, the length being a quarter of an inch greater than the width. This cup is encircled by a one piece bend of flexible spring steel, faced with a special prepared leather, which bears against the outer surface of the steel cup, thereby producing the required friction.

#### New Multicylinder Car.

A twelve cylinder car has been built by George Schebler, of Wheeler & Schebler, Indianapolis, the car being designed to try out some of Mr. Schebler's ideas. The cylinders are 31/2 inch bore by 4 inch stroke and are cast single, being arranged six on a side at an angle of 30 degrees. The cylinders are so coupled that the driver can cut six of them out at will without changing the gear. Thus, in running with six cylinders the additional six can be put in action if the car is in a ditch or on a particularly bad bit of road. In building the car Mr. Schebler used a Marion chassis and body, adding eight cylinders to the four of the Marion car. The twelve cylinder car is rated at about 75 horse power and has proven satisfactory in speed and hill climbing tests.



VASCO WIND SHIELD.

#### New Vasco Wind Shield.

The new Vasco wind shield is quite different from other makes, operating upon an entirely new principle. Friction discs instead of springs are employed, and the driver can tilt the upper half of the shield at any angle desired with one hand while the car is in motion. There is no awkward adjustment necessary to cause a quarter of an hour's delay when a storm suddenly comes up while on the road, and the fact that the shield can be easily tilted when the sun is at an annoying angle makes it especially desirable.

A noteworthy feature of this device is the "gap," by which protection from rain and snow can be secured and yet making a clear view ahead possible. The Victor Auto Supply Manufacturing Company, of 42 West Forty-third street, New York with a factory at Providence, R. I., are the active manufacturers and distributors of the Vasco wind shield.

#### New Type Connecticut Dash Coil.

A new type of dash coil, to be known as Type X, has been placed on the market by the Connecticut Telephone and Electric Company, of Meriden, Conn. This is a less expensive coil than their regular standard make, and is considerably smaller. It is made up on the unit system, with the exception of the one cylinder style, which is of the solid type. All units are removable and interchangeable without changing a wire connection. This coil is also fitted with one adjustment. The cases are mahogany, highly finished, and are fitted with type P, L or magneto switch as desired.



CONNECTICUT TYPE X COIL

# GREAT QUESTIONS OF AUTOMOBILE ENGINEERING.

# Unit versus Multi-Unit Cylinder Construction.

BY ALBERT L. CLOUGH.

In comparing the relative advantages possessed by the practices of casting motor cylinders in single units, pairs or blocks of three or four, it is well to remember that the use of single cast cylinders is an old and thoroughly accepted practice. Casting in pairs has also been common for a long time, and its adoption by manufacturers aroused very little comment upon the part of motor car users. Casting in triplets and quadruplets, or true block construction, is, however, of rather recent introduction. although much more familiar abroad than here, and the practice has aroused very great interest among automobilists. Casting four cylinders en bloc, as compared with casting in pairs, is rather a difference in degree than in kind; but for some reason public attention has seized upon the four cylinder block motor as an innovation of a radical nature, and has criticised it in the way that every novelty of a rather startling nature is criticised. In fact, block construction has been to a certain extent prejudged, and it is quite possible that some of the arguments arrayed against it, even before it was fairly adopted in this country, are of less weight than was at first supposed.

As set forth by its advocates, the primary advantages of including more than one cylinder in a single casting are reduction in engine bulk and weight and diminution in foundry and machine shop expense. These advantages are realized to a certain extent by casting cylinders in pairs, but in a much fuller degree by casting all the cylinders of a four cylinder engine en bloc and in casting the cylinders of a "six" in two sections of three each.

The reduction in bulk, or rather in engine length, comes about by bringing the cylinder walls of adjacent cylinders together, thus reducing the total length of the engine by the amount of the cylinder walls, water spaces and jacket walls which are dispensed with, namely, three cylinder walls, six water spaces nearly and six jacket walls. If the cylinder walls of neighboring cylinders are not brought together, but are separated by a restricted water space, the total length saved is somewhat more than three water spaces and six jacket walls.

The advantage pointed out as accruing from decreased engine length is that, with a given wheel base, there will be just so much more space available between the axles for the useful load, or, looking at the matter in the other way, for a given useful carrying space, the total chassis length may be reduced and its weight and cost somewhat decreased.

REDUCED WEIGHT AND BULK.

Reduced engine bulk means reduced weight in proportion as water and iron are dispensed with in the cylinder construction, and, of course, the crank case weight is decreased in a similar proportion. Diminished engine weight may permit a certain reduction in frame and running gear weight and will at least effect a constant saving in fuel and tires during the entire life of the car. It is further instanced as a merit of block construction that after patterns are perfected and founders are accustomed to the production of block castings the per cylinder cost of founding is much less with this construction than in the case of twin construction, and still less than with singly cast construction. The claim is made that considering the rough casting only the cost of the block of four is not over two-thirds that of four singles.

COST AND ACCURACY OF MACHINE WORK.

The per cylinder cost of machining a block of four cylinders is stated to be decidedly less than that of machining two pairs, and still less than that of finishing four singles, on the ground that multiple spindle boring mills can be used and fewer setting up operations are required in the case of the block, and not only is the machine work thus reduced but it is stated to be more accurate in the case of the block on account of the fact that all cylinders are bored at a single setting of the piece and parallelism of the bores is thus secured. As block construction favors the casting of the upper crank case section integrally with the cylinders-an expedient which is hardly practicable in single or paired practice-considerable machine work is said to be saved at this point.

Reduced manufacturing cost is, of course, of interest to the user, as it ultimately results in lower selling prices.

A further claim in behalf of block construction is that, since the whole engine is virtually one casting, a degree of rigidity unattainable in the single and paired construction is secured. Silent running and less vibration are the consequences, and it may be possible to reduce the weight of the crank case, since the stresses imposed upon it are much reduced.

#### INTEGRAL MANIFOLDS.

The intake manifold, being generally cored into the casting of a block motor, is thus water jacketed, and it is held that this greatly reduces the tendency toward condensation of the fuel and conduces to a more economical mixture with less liability toward carbonization. Whatever heat is taken by the mixture tends to reduce the temperature of the jacket water. The fact that there is but one mixture connection for all four cylinders, and a number of

joints in the intake system are thus avoided, is held to secure greater immunity from the development of air leaks.

But two water connections are required with the block motor, as against four in the paired construction and eight with the single construction (unless a series connection is adopted). This is held to make the block engine much cleaner in appearance and more free from troublesome leaks.

The water jacket space being a single one in the block motor it allows of very free water circulation, and is thus admirably adapted to use on the thermo-siphon system in which the circulating force is slight.

Reduced labor in assembling and dismounting is claimed as a virtue of the block motor, on account of the cylinder unit being in one piece and only two water and gas connections being required.

It is also pointed out that in a block motor using a single cam shaft a single plate may be designed completely to enclose all valve actions, shutting in the noise and lubricant and shutting out the dust.

Looking at this subject from the contrary viewpoint, the shortness of the block motor is adduced as a disadvantage in that it renders difficult or impossible the proper supporting of the crank shaft. In the form of block construction in which neighboring cylinder walls abut one upon another, the space for bearings within the block becomes exceedingly restricted, and the designer is forced to extremes in securing crank shaft support. The ball bearing is generally resorted to as being more effective per unit of length than the plain bearing. but it is a view largely held that this type of bearing is undesirable. Difficulties of a serious nature are met with in applying such bearings to the shaft-built up shafts, split bearings and other expedients being resorted to, or bearings of excessive diameter and high ball speed being adopted. Many persons believe that a five bearing shaft, such as is naturally used with the unit cast cylinder construction, is the preferable type, and such a shaft is well nigh impractical in a block motor of this type That it is even difficult to secure three adequate bearings for such a motor is the opinion of many disbelievers in block construction. The two ball bearing crank shaft is looked upon very much askance by a large contingent, despite the large number of these shafts which are giving good service. It is further pointed out that if a block construction is adopted which provides complete cylinder walls with water spaces between them, while the opportunity for more adequate bearings is afforded. much of the advantage of the shortness of

the block motor is sacrifieced. The answer of the "block contingent" to these aspersions regarding bearings is that their crank shaft is short in proportion to the reduced length of the motor, and transverse stresses are thus greatly reduced, and that the metal saved in the length goes far toward giving the shaft the "stubby" character which reduced bearing provisions demand. They point to what they consider highly successful crank shaft service on a large scale under their various bearing constructions.

#### LOSS OF CASTINGS.

In regard to the production of four cylinder blocks, it is adversely stated that on account of the excessive complication of the work defective castings are numerous and that not only is there a serious waste in the foundry but that there is a large waste of labor in machining castings which do not exhibit defects until well along toward completion. In reply to this criticism it is pointed out that manufacturers who have adopted block construction have generally adhered to it, and that new firms are taking it up.

Another common criticism against block construction is that in case of an injury to one cylinder, such as a scoring of the walls. the whole block of four has to be replaced, while one scored cylinder of a pair requires the replacement of the pair only and a damaged "single" requires the renewal of that cylinder only. In reply to this objection the manufacturer of block motors quotes a price for the complete cylinder block which he considers compares favorably with the prices charged by other makers for pairs and singles, everything taken into account, and he further remarks that many cylinder accidents, such as freezing and lubrication failures, commonly involve more than one cylinder.

#### UNEQUAL EXPANSION.

The advocate of casting cylinders singly very properly suggests that the expansion of one of his cylinders, under heat, has no effect upon any of the others, since they are entirely separate, and those using the paired construction point out that the expansive effects of only two cylinders are interrelated, but that in the block motor there are four cylinders inseparably connected which are hot at their tops and cool at their lower portions, and that the tendency is for the block to increase in length at the top and throw the cylinder axes out of parallelism. (See article by F. E. Watts, p. 513, Vol. 22, of this journal.) Not only so, but in case one cylinder fails to ignite for any length of time it remains relatively cool, and the cylinders on each side of it transmit to it stresses which deform it. In answer to this latter point it is claimed that, as all cylinders are subjected to the same mass of freely circulating water, the temperatures of all tend to be equalized thereby.

The fact that all the cooling water of the block motor is in a single communicating space lays this construction open to the objection that the flow is likely to be indefinite and given to eddies and that it is not so easy to direct the current upon the spots which specially require an active circulation, the result being excessive heating and distortion at these critical points. In refutation of this claim it is remarked that with the thermo-siphon system, as commonly used with these motors, and a design which effectually prevents steam pockets, the flow is automatically most active at the hottest spots and only slight temperature differences develop.

In block construction in which there is no water space between adjoining cylinders it is claimed that these lines of unjacketed wall space become very hot and that an excessive amount of oil must be supplied to make up for the thinning of the lubricant at these points and the distortion which there occurs.

#### CHARGE DISTRIBUTION.

The point is made against the practice of cored in gas passages that charge distribution is not so good as with the external pipe arrangement of special form and that the rough internal surfaces of the cast gas passages tend to throttle the entering charge at high speed to a greater degree than the smooth internal surfaces of the tubing used in other types of engine.

#### Automobiles in Java,

Java, the Dutch colony, is becoming a considerable market for automobiles. The imports of automobiles into the island were first separately enumerated in 1903, when they amounted to 32,086 guilders. During the following years the value of these imports rose rapidly, as is shown by the following figures: 1904, 60,860 guilders; 1905, 118,765 guilders; 1906, 219,231 guilders; 1907, 905,662 guilders. During 1908 the value of the imported cars undoubtedly considerably exceeded 1,000,000 guilders.

One of the factors which tend to promote the use of automobiles in Java is the fine road system constructed by the Colonial Government, and another the wide area of the cities, whose transit facilities have only as yet been slightly developed. This applies particularly in Batavia, whose white and colored population numbers 10,000, and which covers an area of 6 square miles. Owing to this condition the European families living in that city have always considered a light vehicle a necessity, and at the present time Government officials, merchants. physicians, planters, factory managers and even a considerable number of wealthy Chinese are substituting the automobile for the horse. The most popular type of vehicle is the four cylinder, double phaeton of 10-15 or 12-16 horse power, which sells at about 4,500 guilders. The four cylinder type of vehicle is preferred because it surmounts the hilly roads of the country with ease. It is possible to build the body in Java, but up to the present it has been customary to import the vehicles complete, owing to the fact that bodies of European design and workmanship are of more pleasing outline and more perfect finish than those constructed in Java with the aid of Chinese labor. Motorcycles are not sold to any extent, although recently the so called Moto-sacoche wheel is successfully being introduced.

In order to introduce automobiles on the market in Java it is advisable to establish an agency in Batavia, with sub-agencies in Samarang and Soerabaya. Cars of the best selling types should constantly be kept on hand at these agencies, as well as repair parts, and a repair shop should be maintained. Another possible method is to place an agency with some existing firm possessing a repair shop.—Belgian Consular Report.

#### Kansas City Show Balked.

It is now doubtful whether the show planned for Kansas City next spring will be held. At a smoker given by the Motor Dealers' Association at the Hotel Baltimore on November 6 five of the leading dealers of the city positively declared against the show, owing to dissatisfaction with the spaces assigned to them last year, and also because they hold that the demand for cars in that territory is so great at present that they can easily sell their respective allotments without a show. Those who voted against the show were the representatives of the Ford Automobile Company, Buick Automobile Company, Hathaway Electric Car Company, C. L. Taylor Motor Car Company and Maxwell-Briscoe Motor Car Company. Two other important firms were non-committal. In spite of these dissensions the following committee was appointed to select a show building and make the necessary arrangements for the show: E. D. Anderson, Henry Bruenning, Walter McGee, J. R. Histed and J. Frank Witwer. Another meeting will be held shortly.

#### New Valve Grinding Compound.

A new substance recently put upon the market with the idea of saving motorists labor and money in valve grinding is being manufactured by the Victor Auto Supply Manufacturing Company, 42 West Forty-third street, New York, and is known as Vasco Grindine compound. Grindine has been prepared to eliminate the dangers of emery, and is claimed to do it most efficiently. The abrasive in the compound is an electro-chemical product, and was selected for its extreme hardness, sharpness and temper. The binder used has a high viscosity, and is claimed to produce a smooth, even surface. It is conveniently put up in collapsible tubes, both coarse and fine, and remains at the right consistency. One of the chief virtues is said to be that it does not waste away or drop into the cylinder during the process of grinding, and, besides this, it cuts quite rapidly.

# COMMENTS AND QUERIES OF READERS.

# Valves in Cylinder Heads. Editor Horseless Age:

I am a subscriber of your valuable paper and have read it for a number of years. Five years ago I built a four cycle marine motor with two cylinders, valves on opposite sides, bore 6 inches, stroke 7 inches. It has always run and is as good today as ever. I am going to build a four cylinder motor of the same bore and stroke, but I prefer to put the valves in the head of the cylinder, feeling that I can get more power by exploding the entire charge directly over the piston. I cannot see the advantage of exploding about one-half of the charge in the valve pockets. There should be no difficulty in keeping the exhaust valve cool, as the water can be introduced directly over the exhaust outlet. Is there any objection to my theory?

Considering the stroke, would 35 per cent. of same give me 65 pounds compression?

G. F. S.

[If you place both valves in the cylinder heads you will get slightly more power than if you placed them in pockets at the sides of the cylinders. As we understand that the motor is to be used for marine purposes, we presume that you will make the heads detachable, in which case the valve seats can be directly in the head castings and need not be in cages, as would be required if the heads were cast integral with the cylinders. With the valve seats in the heads directly they can be perfectly water cooled, and there is no more danger from overheating them than if they were located in side pockets. On the other hand, if the heads are to be made integral and the valves located in cages, it is somewhat difficult to keep the exhaust valves cool in a motor of this large size if it has to run continuously under full load.

A compression space of 35 per cent. of the stroke should give you about 72 pounds gauge compression.—Ep.]

#### Rotary Motors.

Editor Horseless Age:

I would like very much to know the source of the gentleman's information on rotary aeroplane motors as to their being scrapped.

At present the world's records for duration and length of flight are held by rotary motors, in fact by the same motor, the "Gnome," similar to that described by you. The new type now being evolved has the propeller blades attached to the head of the cylinder.

This type of engine apparently has a great future before it. I would also like to know the "unsolved problems" connected with rotary engines—there are none that I know of and I have been engaged in their study for about six years. There are slight dif-

ficulties to be overcome, but they are still present in the automobile motor of the present day.

Standard sizes of rotary engines are for sale in France and England today, and some experimental work has been done with them for rigid dirigibles, as per sketch.

W. G. MARTIN.

[As our correspondent who made the inquiry about the rotary motor is located in Switzerland it will be some time before an answer regarding the source of his information can be expected from him.

One of the most difficult problems in connection with the rotating cylinder motor is undoubtedly that of lubrication. It will be observed from the test results of the Gnome motor that the oil consumption was one-half the fuel consumption, whereas in ordinary motors the oil consumption is only about one-twentieth the fuel consumption. We understand that during the Rheims week Farman's plane constantly left an oil smoke trail behind. Other unsolved prob-



lems in connection with rotary motors were mentioned in The Horseless Age of March 17, 1909.

In this connection we beg to point out that the rotary cylinder motor was first commercially developed in this country by the Adams Company, of Dubuque, Ia., who have been building automobiles with such motors for the market since 1904 and had been experimenting with this type of motor since 1898. The company last year built a number of aeroplane motors of this type.

—ED.]

#### Engine Braking.

Editor Horseless Age:

Enclosed find clipping relating to the use of the clutch in driving. I would like your opinion in the matter. I have always understood that it was the best practice never to brake against the engine, and therefore I invariably throw the clutch out when I put on the brakes to slow the car for bad crossings or water breaks in the road. Of course I try and use judgment in braking, and do not jam them on and slide my wheels. If I am wrong in this I would like your reasons for the use of the clutch as suggested by the Autocar. B. B. H.

[The article in the Autocar referred to recommends the use of the throttle wherever practicable when slowing down the

car instead of using the clutch for the pur-The advice is absolutely sound. If, when it is necessary to slow the car, as when approaching a blind corner, you left your throttle in the same position and attempted to cut down the car speed by slipping the clutch, you would continue to generate the same power in your motor and use up the excess power in wearing out the clutch. If, on the other hand, you partially close the throttle you reduce the fuel consumption and the power of the motor in accordance with the requirement at the lower speed. When it is necessary to reduce the speed considerably in a limited time a complete closing of the throttle valve, as suggested in the article, is advisable, and the fitting of a valve which opens the cylinder to the atmosphere when the throttle is thus completely closed is a very good idea which has been championed in these columns on occasions, as it tends to cool the motor and prevents sucking an excess of oil from the crank chamber up into the cylinders. Such an air valve is particularly valuable where the car is often allowed to coast.

The brakes should in general be used as little as possible—the same as the clutch. and for substantially the same reasons. Where the car need not be stopped in a very short distance it should be allowed to come to rest of itself by cutting off all fuel from the engine, except where it is desired to start the engine again on the switch. Of course, where a quick stop must be made the brakes must be applied, and then the clutch should first be withdrawn (if this is not done automatically) so that the brakes need to kill only the inertia of the car and not that of the engine also.—ED.]

# Wire Gauze Screen in Inlet Pipe. Editor Horseless Age:

I have read somewhere that by inserting one or more screens of fine mesh wire gauze (about 100 to 110 mesh) in the intake pipe of a motor between the carburetor and cylinders there is a marked saving in the consumption of gasoline with a slight addition of power.

Will you kindly give me your opinion as to whether there would be any advantage in inserting the gauze as stated, and also if it would be likely to cause any trouble.

It would seem to me to be advantageous in preventing the carburetor catching fire from the popping back of an ignited weak charge, as it is well known that flame will not pass through fine gauze until the gauze itself is heated to a high temperature.

Any comments or information you can give will be greatly appreciated by your subscriber.

A. L. M.

[The gauze screen might have some effect tending to make the charge more

homogeneous, but we do not believe that the effect on the fuel economy and the power would be appreciable. In fact, unless you make the fitting containing the wire gauze very large, so that the aggregate cross section of the openings in the gauze is materially greater than the cross section of the inlet pipe, the screen would have a throttling effect and reduce the maximum power of the motor. Such a screen will prevent back firing in the carburetor, but it seems to be the general opinion that it is not needed for this purpose. It is better to keep your carburetor properly adjusted, and no back fires will occur.—Ep.]

#### Calculation of Chassis Springs-Correction.

Editor Horseless Age:

In the second instalment of the article on "Calculation of Chassis Springs" there should be a figure one (1) in place of the lower case 1 in equation (3). This error is evidently due to the use of the same typewriter character for the letter 1 and the figure 1.

ASHER GOLDEN.

#### Queries.

Editor Horseless Age:

Could you find space in your journal to answer the following?

In the second column on page 407 of your issue of October 13 you state that the two cycle motor lends itself less to air cooling than the four cycle. Is this so, or is it a printer's error, as another motor journal repeatedly stated that the two cycle should be easier to cool than the four cycle?

Are the successful Elmore engines two or three port, and can you give the approximate sizes of the ports; also the bore and stroke?

Can you briefly sum up the working advantages and disadvantages of the two cycle as compared with the four cycle, assuming an equal number of cylinders of the same bore and stroke?

Some years ago a friction transmission, as shown (very much exaggerated) in the accompanying drawing, in which there are two large friction discs and two rollers on two short shafts, with final chain drive, was very much advertised. Do you know why this type is not a success, and can you state why the friction drive is not more in favor? What are the advantages and disadvantages of the system?

[Whether it is more difficult to cool a four cycle or a two cycle motor is, of course, a matter of opinion. With the four cycle motor you encounter one set of difficulties, and with the two cycle another rather different set. With the four cycle motor the most difficult problem is to keep the exhaust valves at a sufficiently low temperature. This difficulty is not met with in the two cycle motor, as it has no exhaust valves. On the other hand, owing to the fact that there is an explosion in each cylinder of a two cycle motor at each revolution of the crank shaft, the cylinder walls of a two

cycle motor are in contact with hot gases during practically twice the proportion of the time as the walls of a four cycle motor. and you do not have the intervening inlet stroke to cool the cylinder walls. There is absolutely no doubt that more heat must be disposed of per unit of cylinder wall area in a two cycle than in a four cycle motor. Another difficulty that you encounter in attempting to air cool a two cycle motor is that because the exhaust ports are usually on one side of the cylinder and the inlet ports on the other, the cylinder is heated and expands unevenly, and it is quite difficult to keep the cylinder wall in the vicinity of the exhaust port at a temperature permitting of continuous lubrication. It would be interesting to hear from a number of those who have had experience with air cooled two cycle motors as to the relative difficulty of air cooling the two types.

The Elmore engines are of the three port type. Last year the company built motors with cylinders of 4½ inch bore and 4 inch stroke. We do not have the port dimensions of these motors.

The advantages and disadvantages of the two cycle motor will be discussed in an article in an early issue.

If we remember correctly, the firm which



manufactured the friction drive to which you refer failed, but we are unable to say whether their failure was due to faults of the drive or to poor business management. The reason the friction drive is not more used at present is that manufacturers have been increasing the power of their cars from year to year, and there are now very few models of less than 20 horse power, 30-35 horse power being very common powers. But to transmit such large powers requires a very large friction mechanism which it is difficult to find room for on a vehicle without making it look clumsy. The chief advantage of the friction drive is its great simplicity, and another important advantage is that it gives continuous gradations of speed, instead of simply three or four steps. The weakest point of this form of drive is undoubtedly that it is not positive, and a minor disadvantage (minor at least when small cars only are considered) is its bulkiness.-Ep.]

#### Oil for Multiple Disc Clutch.

Editor Horseless Age:

I would be much obliged if you would kindly advise me the best kind of oil to use in a multiple disc clutch that is used on a four cylinder automobile. I would like to know the best kind to cause the clutch to take hold gently and not suddenly, and hold when it does take hold.

D. L. BAUGHMAN.

[A machine oil of medium body is generally recommended. Disc clutches vary greatly in this respect, however, some being even made to operate entirely without lubrication, and you should preferably inquire of the maker of your car what grade of lubricant he recommends and how much should be used.—Ep.]

#### Battery Charging Dynamos.

Editor Horseless Age:

As a subscriber of your paper I take the liberty of asking you to advise me if possible where I can best buy a small dynamo suitable to supply current sufficient to light five lights on my touring car. I am now using such lights, but they use up storage battery too quickly.

GEO. B. LINNARD.

[Such dynamos are manufactured by the Apple Electric Company, Dayton, Ohio, and the Dayton Electric Manufacturing Company.—Ep.]

#### Manufacturers of Farm Tractors. Editor Horseless Age:

Will you kindly give me the address of some firm, if there are any, which makes automobiles or motor trucks suitable for farm purposes? I am taking a course in automobile operation at the Y. M. C. A. Institute, with a view to using one on a farm.

Geo, W. Dower,

[Following is a list of manufacturers of motor wagons and farm tractors operated by gasoline motors: The Avery Company. Peoria, Ill.; the Gas Tractor Company, Minneapolis, Minn.; the Transit Thresher Company, Minneapolis, Minn.; Hart-Parr Company, Charles City, Ia.—Ep.]

#### Tire Sizes.

Editor Horseless Age:

What size tires would you recommend for a six cylinder Stevens-Duryea car? I read your report of the show and was much interested in same. C. A. Hudson.

[The standard equipment of the Stevens-Duryea 1909 models is 34x4 inch all around on the Light Six, and 36x4 inch front and 36x5 inch rear on the Large Six 40 horse power. So far as we know these sizes are the best for these cars.—Ep.]

# Muffling Rotary Cylinder Motors. Editor Horseless Age:

In your issue of November 10. I notice an article on rotary motors. Will you inform me how these rotary engines are muffled, or does the rotary action of the motor serve to reduce the sound sufficiently and thus obviate the need of a muffler?

H. M.

[These motors are usually made without muffler, exhausting into the atmosphere directly when used on an aeroplane, and into the more or less closed space in which the motor is located when used on a car.—Ep.]

# Races on the New Atlanta Speedway.

Tuesday of last week marked the formal opening of the new motor speedway at Hopeville, Ga. The fine weather served to bring thousands of spectators to the track, who almost filled the large grand stands. Most of them arrived early and awaited with keen anticipation the opening pistol shot. The grand stands are ideally located, both as to the view they give and the safety they afford, which latter lent assurance to the crowd. As a further precaution against accident no one was allowed near or on the track. The stretch where the stands are located is through a cut with 12 foot banks on both sides. The stands are located on the outside of the track, and directly opposite on the inside are the timers' and judges' stand and the press stand. The stands being at the top of this almost perpendicular bank makes it impossible for a car to break through into the spectators. At the eastern end of the covered stand the Capital City Club have erected a covered stand for the use of members and friends, with a seating capacity of 450. At this meet an automatic time recorder invented by C. H. Warner, of the Warner Instrument Company, Beloit, Wis., was used for the first time.

The opening event consisted of time trials with plate prizes for first and second places. There were five entries, as follows: Lewis Strang, in his 200 horse power Fiat; Barney Oldfield, in his 150 horse power Benz; John M. Rutherford, in a 30-60 horse power Stearns; T. Cliquot, in a 90 horse power Pope-Toledo, and Walter Christie, in a 150 horse power Christie.

Christie broke a valve head and made the trial on three cylinders, and Cliquot did not finish his starting circuit owing to ignition troubles. Strang was first to make the trial and drove furiously, setting a new American track record of 37.70s., beating the world's record held by Oldfield by 5.3s. John Aitken, 40 horse power National, and Tom Kincaid, 40 horse power National. In this event Strang was slow to get away. Aitken and Kincaid in their Nationals were leading and about on even terms. The



STRANG IN 175 H. P. FLAT, AFTER ESTABLISHING NEW SPEED RECORD.

Oldfield also lowered his own record by 2.97s.

The final results of this event were:

First—Strang, Fiat, 37.71 seconds. Second—Oldfield, Benz, 40.13 seconds. Third—Christie, Christie, 43.82 seconds. Fourth—Rutherford, Stearns, 50.85 seconds.

In the second event, 10 miles for stock chasses of 451 to 600 cubic inches, with two prizes, both cups, there were six starters, as follows: Basle, 30-45 horse power Renault; Harding, 50 horse power Apperson Jack Rabbit; Strang, 60 horse power Fiat; Rutherford, 30-60 horse power Stearns;

National team drove a fast, hard race and were never once in danger. Strang quit on his second lap, owing to motor troubles. The two Nationals kept within a length of each other until near the fourth lap, when Aitken gradually drew away from Kincaid, while both cars were increasing their lead over Harding in the Jack Rabbit. At the finish Aitken led Kincaid by about 100 feet, and the Jack Rabbit by about a half mile.

In the third event, to miles for stock chasses of 161 to 230 cubic inches cylinder capacity, the contestants were: Jas. H. Rodger, 20 horse power White gasoline; Louis Scroitzer, 22.5 horse power Fuller: William Knipper, Chalmers-Detroit; Joe Matson, Chalmers-Detroit, and Joe Nelson 18 horse power Buick. Matson got away first, closely followed by Nelson in the Buick On the first lap Nelson had about one length lead over Matson, but at the finish of the second lap the Buick and the two Chalmers were bunched, with not over 20 feet between the first and third car. On the third lap Nelson in the Buick and Matson in the Chalmers were exactly abreast of each other, running a bonnet to bonnet race. Rolgers in the White gasoline was running a half mile back of the three leaders, with De Fuller a mile in the rear. On the fourth lap Matson was leading his team mate Knip per by only 20 feet, and Nelson by about 50 feet. At the finish of the fifth and last lap Matson crossed the wire first, closely followed by Knipper, with the Buick stiff 30 feet behind. The White gasoline for ished fourth and the Fuller last.

Of the eighteen entrants in the footh



THE PITS OPPOSITE THE GRAND STAND.

event, which was a free for all handicap, with first prize of \$150 and a second prize of \$50, only eight started. The starters and their handicaps were:

Harroun, Marmon, 70 seconds. Stillman, Marmon, 60 seconds. Disbrow, Rainier, 55 seconds. Cliquot, Renault, 45 seconds. Basic, Renault, 35 seconds. Kincaid, National, 25 seconds. Aitken, 60 b. p. National, scratch. Oldfield, 60 h. p. Knox, scratch.

Oldfield did not finish the first lap, his motor going wrong on the back stretch. The two Marmons seemed to be holding their own, while Basle in the Renault was gradually pulling away from Cliquot, also in a Renault; but the dashing driving of John Aitken in the 60 horse power National enabled him to pass one after another of the other drivers and establish a new world's record of 8m. 2.41s., breaking the record of the entrant) and \$600 in gold; the second prize \$300 in gold, and the third prize \$150 in gold. The starters were: Basle, 35-45 Renault; Lorimer, 40 Chalmers; Dingley, 40 Chalmers; Stillman, 35 Marmon; Chevrolet, 30 Buick; Cliquot, 35-45 Renault; Aitken, 40 National, and Kincaid, 40 National.

Chevrolet in his Buick early forged to the front and set the pace. In the seventh mile the National driven by Kincaid stopped, owing to trouble with the steering gear, and was out for seven laps. On the fourteenth mile the other National, driven by Aitken, withdrew definitely from the race. At the twentieth lap the race seemed to lie between the two Chalmers-Detroits and Chevrolet's Buick. In the forty-fifth mile Chevrolet overtook the Chalmers driven by Lorimer, and gained his first lap on this car since the race began. At the end of the fiftieth mile Chevrolet led his nearest

stretch. The crowds were now wild with excitement. World's records went to smash with the completion of the first 100 miles, Chevrolet covering the distance in th. 24m. 8.71s. The former record, held by Aitken in a National and at the Indianapolis Speedway, was 1h. 31m. 41.9s. At the 160th mile Lorimer was forced to stop for a few minutes for repairs. As he finished his 172d mile Dingley was forced to stop and change one of his rear tires. After 150 miles Kincaid was forced to retire because of engine trouble. In the 168th mile the Marmon car, driven by Stillman, which had up to that time been "neck to neck" with the two leaders, blew out a tire on the back stretch, and immediately all four wheels collapsed and the car skidded right side up like a stone boat off to the inside edge of the track. Stillman and his mechanic, Dawson, were thrown out, but neither suffered injury. The order of finish and the times were as follows:

- 1. Chevrolet, Buick, 2:46:48.47.
- Dingley, Chalmers, 2:53:33.91. Lorimer, Chalmers, 2:55:15.61.

#### Second Day's Races.

The attendance the second day was good, the crowd all but filling the bleachers and the grand stand being about three-quarters full. All of the races started promptly and there was none of the delay between events so common in connection with track races. The first event, which started at about II o'clock, was the 20 miles motorcycle race for professionals. While the time in this event was not as fast as in the events for larger cars, considering that none of the motors were over 7 horse power, it was very creditable, and considering that the machines were much more nearly matched than in most car events the race was quite interesting as a test of the driver's skill in handling the machine. The event brought out five starters. R. W. Gayle, Joyce and R. Stubbs rode 7 horse power Indians; Russell Walthour rode a 7 horse power Merkel, and V. Moss a 7 horse power R-S.

At the start Stubbs jumped into the lead and rapidly distanced the field, but in the fourteenth mile he unfortunately broke an exhaust valve and was obliged to retire. Then began a good race between the others for first place, Walthour finally winning, his time for the 20 miles being 20m. 16s.; second, Joyce, 20m. 27s.; third, V. Moss, 20m.

The second event was the 10 mile stock



AITERN AND KINCAID IN NATIONALS.

established by Oldfield in a Benz at Indianapolis by 13.49s. The event was won, however, by Stillman (Marmon), whose time was 8m. 54.96s., and Harroun, in the other Marmon, secured second place.

The fifth event was a 2 mile free for all. The starters were Strang, Fiat; Oldfield, Benz; Christie, Christie, and Aitken, National. Strang fairly ran away from the rest and won in 1m. 31.63s. Oldfield was second in 1m. 37.18s.; Aitken third in 1m. 43.72s., and Christie fourth in 1m. 51.4s.

The sixth event was a 200 mile race for stock chasses of 301-450 cubic inches displacement, the first prize being the Coca Cola Trophy (valued at \$5,000, which must be won three times to become the property competitor by nearly 2 miles, Dingley, of the Chalmers team, was second, and Lorimer in the other Chalmers third. At the sixty-ninth mile Chevrolet finally succeeded in gaining a lap on Dingley. The Buick passed its rival in front of the grand stand, and the spectators stood and cheered lustily.

As Chevrolet passed the grand stand in the seventy-third mile it was seen that his car was on fire. Smoke was pouring from the hood and it seemed he must quit. He did stop on the back stretch to extinguish the fire, and this delay cost him the lead he had on the two Chalmers cars, as they caught up with and passed him. In the seventy-fifth mile Chevrolet caught up with Dingley again and passed him on the back



START OF 200 MILE RACE (WEDNESDAY).

chassis race for cars from 451 to 600 cubic inches. This brought out four starters, viz., two 60 horse power Fiats, driven by Strang and Robertson; a 60 horse power Stearns, driven by Marquis, and the Apperson Jack Rabbit, driven by Harding. At the start Strang jumped into the lead and at the end of the first two mile lap he had a lead of about one-eighth of a mile. The Apperson was second, with the Fiat and Stearns in close pursuit. At the end of the third lap Strang was stopped by engine trouble and the Apperson took the lead. At the end of the fourth lap Robertson and his Fiat also withdrew. This left only the Apperson and the Stearns in this race. The Apperson finished first in 8m. 30.68s. The Stearns came in second.

The next event was one of the prettiest races of the day, being a 10 mile amateur free for all, the contestants being local men, and considerable enthusiasm was shown among the spectators. The entrants were Oldknow on a 30 horse power Buick. Calvin Travis on a "40" Chalmers and J. M. Rutherford on a Stearns.

The feature of the race was the battle royal between Travis and Oldknow. Almost all the way to the finish Travis led, but a blanket could have covered the two machines. Turning into the stretch Travis was leading by at least 20 yards, but Oldknow made one of the most spectacular sprints so far seen on the track and managed to beat Travis at the tape by not more than the front spring's length.

The 4 mile free for all brought out some of the most powerful cars on the track. Strang's 175 horse power Fiat, Christie's front drive 130 horse power, Aitken's 60 horse power National, Robertson's 60 horse power Fiat and Disbrow's 50 horse power Rainier. Strang, as usual, led the field at the end of the first lap. Robertson withdrew. The Rainier, on account of its smaller power, was hopelessly outclassed, but kept at it. Strang was never headed and finished first in 2m. 47.038. Christie was second in 3m. 7.63s., and Aitken a close third. Christie, whose car has only two gears, was at a disadvantage in not being able to get away as quickly as some of the others.

The star event of the day was the three cornered match race between Oldfield. Strang and Christie, the former on the 120 horse power Benz, Strang on his big Fiat and Christie on his front driven machine. After two false starts-the start in this event being a flying one-they finally got away with Strang in the lead and Oldfield a close second. Strang gradually increased his lead on Oldfield, and Christie, who had made a rather poor start, was gradually closing up the gap. At the end of the sixth mile Christie seemed to be in trouble and lost ground. Strang won in 7m. 1.94s., and Oldfield came in second, his time being 7 m. 27.71s.

The next event was the 100 mile stock chassis race for machines of from 161 to 230 cubic inches piston displacement. This

brought out six starters, viz., the two Chalmers, driven by Matson and Knipper; the Buick, driven by Nelson, and two E-M-F's, driven by Jones and Yeager. At the start the two Chalmers jumped into the lead, followed closely by the Buick, the others following in the rear. At the eighth mile the Buick passed Matson's Chalmers, but Knipper still maintained a good lead. Shortly after this Matson stopped for some repairs and then went on again. At the end of the fourteenth mile Knipper stopped to take on supplies when he had a lead of about a mile on the Buick. Matson's stop for repairs put him back to last position, but nothing daunted he restarted and kept steadily at it. This steady work soon told, and he gradually picked up car after car until he was in third position, Nelson on his Buick being now in the lead, with Knipper pressing him closely. This order conhorse power Marmon; L. Basle, 20 horse power Renault, and Joe Matson, 30 horse power Chalmers. The race was won by Harroun in the Marmon in th. 49m. 2648. Harroun did not stop his car during the entire race. Matson in a Chalmers was 6 miles behind the Marmon, while Basle in the Renault and Chevrolet in the Buick were 18 miles behind the winner. The Buick stopped five times with engine trouble and once caught fire. The Chalmers did not stop in the race, and finished second in th. 57m. 22.92s, The Renault finished third in 2h. 9m. 15s.; Buick last, time, 2h. 9m. 30.13s.

The 6 mile professional motorcycle race was next on the program, the motor displacement being limited to 60.32 cubic inches (5 horse power). Three cash prizes were offered of \$25, \$15 and \$10 respectively. The entrants comprised three Indians ridden respectively by Stubbs, Joyce and Gall.



CHEVROLET (BUICK), WINNING 200 MILE RACE ON TUESDAY.

tinued till the 90 mile mark was reached, when Nelson discovered that his oil supply was low. This caused him to slow down considerably, and Knipper gradually closed up the gap, and finally passed him on the last lap. Matson had also been keeping at it steadily, and he passed Nelson less than a half a lap from the finish, coming in second. The times were: Knipper, 1h. 40m. 46.82s.; Matson, 1h. 41m. 52.46s.; Nelson, 1h. 43m. 10:42s.

During this race a drizzling rain fell and made the track quite slippery, resulting in considerable skidding, and in one case an accident was narrowly avoided. For this reason the 20 mile handicap was postponed till the next day.

#### Thursday's Races.

Thursday opened with a 120 mile race for stock chasses of 231 to 300 cubic inches. The first prize consisted of the Atlanta Auto Association Trophy and \$600 in gold, the second prize of \$300 in gold and the third prize of \$150 in gold. There were four starters, as follows: Louis Chevrolet, 30 horse power Buick; Harroun, 30

and an Excelsior ridden by R. E. Walthour. Stubbs won in 5m. 18.11s., Walthour coning in second in 5m. 44.44s., and Gail third in 5m. 50.87s.

An interesting diversion was furnished after the motorcycle race by the old Haynes No 1, built in 1893. It came plugging down to the grand stand amid shouts and laughter and sincere applause. The fastest time this Haynes machine ever made was 5 miles in 26 minutes. In order to give the crowd an illustration of the progress of the infantry Lewis Strang brought out his 200 horse power Fiat and ran down the track for a few yards besides the Haynes, and then did an exhibition 2 miles in 1m. 21.51s.

In the 10 mile novice motorcycle rare, notor displacement not to exceed 30.5 mbic inches (4 horse power), for two silver medal prizes, G. W. Sisson won in & 53.58s., on an Excelsior; W. J. Friebuer was second on a Merkel. The other starten were Ray Seymour (Reading-Standard). Harry Klebes (Reading-Standard) and John Fahey (Indian).

While lining up for the 20 mile free for all handicap (first prize \$150, second print

Whalen, in a Matheson, was ruled rack for nearly running down Ed.

enault and Pope-Toledo withdrew fth lap, followed by the two Nahe Pope-Toledo and Fiat. Disbrow ier won in 10m. 51.15s., closely fol-Harroun in a Marmon, who came in 20m. 10.63s., and Stillman, also mon, third, in 20m. 23.41s.

ourth event of the day was the 10 ateur championship race of the stock chasses. Rutherford in a got away first, followed by Travis lmers and Oldknow in a Buick. In lap Oldknow overcame the lead got at the start, and it became a veen Rutherford and Oldknow, but a short time, as Rutherford ran om both the Buick and Chalmers in 8m. 42.63s.; Oldknow finished n 9m. 4.17s., and Travis third in 9m. This was vindication for Rutherford, now had bested him on Wednesday ne-hundredth of a second

ext event was easily the most inand most spectacular of the meet at time, and was for 20 mile stock of 301 to 450 cubic inches piston ment, with two cups as prizes. The were: Disbrow, Rainier 50; Lorialmers 40; Dingley, Chalmers 40; , Marmon 35; Aitken, National 40, caid, National 40.

ow was slow in bringing his car to and was not allowed to start. On lap the five leading cars came down ch with scarce 50 feet between them following order: Aitken, Kincaid, , Dingley, Lorimer. On the finish ext lap they were still together, but had advanced into third place. In rth lap Kincaid quit the race, In enth lap Lorimer in the Chalmers tken in the National crossed the a dead heat. Thus they ran up to th lap, when Aitken drew away e Chalmers and finished about 200 ad of Stillman's Marmon, which was feet ahead of Dingley. Aitken had Oldfield's 20 mile record of 16m.

53.8s., made at Indianapolis, by nearly 11 seconds. The results follow:

- Aitken, National, 16:42.76.
- Stillman, Marmon, 16:46.86.
   Lorimer, Chalmers, 16:49.63.

Event 8 was a 10 mile race for stock chasses of 600 cubic inches or under capacity. There were five entries, as follows: Robertson, Fiat 60; Disbrow, Rainier 50; Harding, Apperson Jack Rabbit 50; Aitken, National 40, and Marquis, Stearns 30-60. Robertson got away first; he had a lead of the field of an eighth of a mile at the end of the first lap, and rapidly increased it to a mile. Aitken and Harding ran a bonnet to bonnet race the entire distance. The Stearns went out of the running and had to be towed off the track. Robertson finished over a mile ahead of Aitken, who in turn finished 50 feet ahead of Harding in the Jack Rabbit. Results:

- 1. Robertson, Fiat, 7:47.71. 2. Aitken, National, 8:22.87.

The ninth event was a 4 mile race for stock chasses of 161 to 230 cubic inch capacity. There were four entries, viz., Knipper, Chalmers 30; Matson, Chalmers 30; Nelson, Buick Model 16-18 horse power, and Yeager, E-M-F. 30. Matson took the lead and maintained it, closely followed by his team mate Knipper until the finish. The Buick finished third and the E-M-F fourth.

Matson, Chalmers, 4:05.52. Knipper, Chalmers, 4:08.42.

The last event of the day was a 10 mile free for all handicap, in which two cash prizes of \$150 and \$50 were offered. Robertson in a Fiat 60 was scratch man, while Disbrow in the Rainier and Harroun in a Marmon 32 had 55 seconds, Harding in a Jack Rabbit 50 seconds, Stillman in a Marmon 35 seconds and Aitken in a National 40 had 32 seconds handicap. Robertson made up his handicap and passed every car on the track in the fourth lap and finished half a mile ahead of the field after a very pretty driving exhibition. Results:

- r. Robertson, Fiat, 8:39.8. 2. Aitken, National, 8:50.25.
- Stillman, Marmon, 8:50.53.

#### Friday's Races.

Friday opened with what might have been a serious accident. During the pre-liminary tryouts before the races began the Pope-Toledo "oo" driven by H. I. Kilpatrick, with R. Church as mechanician, blew off two cylinders, caught on fire and turned over on its side, throwing Kilpatrick 150 feet over the bank into a bed of pine shrubs, while Church went rolling down the track. Neither of the men was injured seriously.

The first event of the day was a 10 mile motorcycle race for amateur trade drivers. Teubner on a Merkel got away first, but Klebes on a Reading-Standard took the lead on the first lap and lapped Fahey on an Indian in the third. Fahey quit in the fourth, leaving the contest to the other three riders. The results were:

- 1. Klebes, Reading-Standard, 8:47.17.
- Teubner, Merkel, 8:53.17. Seymour, Reading-Standard, 8:53.77.

Next came the all-professional motorcycle contest for 10 miles. There were five starters as follows: Stubbs, Indian; Joyce, Indian: Gail, Indian: Walthour, Merkel, and Moss, Reading-Standard. At the start they were well bunched, with Gail slightly in the lead. Walthour, however, took the lead in the second lap and led Stubbs, the next closest man, by half a mile at the finish. Result:

- 1. Walthour, Merkel, 8:36.60.
- z. Stubbs, Indian, 8:55.40. 3. Gail, Indian, 10:22.60.

The third number on the program was a 24 mile race for stock chasses of 161 to 230 cubic inches. There were but two entries, both Chalmers-Detroits, driven by Knipper and Matson, respectively. This was a seesaw affair, which was finally won by Knipper in 23m. 40.43s., Matson's time being 23m. 40.77s.

The fourth event was a 20 mile handicap, restricted to contestants in the New York Herald-Atlanta Journal-Constitution tour. There were but three starters, viz.: Whalen, Matheson; Shaab, Renault, and Stoecker, Benz. The honors went to Stoecker, who made the distance in 20m.



KNIPPER (CHALMERS) WINNING 100 MILE RACE (WEDNESDAY).



RAY W. HARROUN (MARMON), WINNER OF THE 120 MILE RACE, NOVEMBER 11.

36.86s. Whalen was second in 21m. 15.64s. and Shaab third in 21m. 55.83s. Stoecker was scratch man, Shaab had 30 seconds, and Whalen 55 seconds handicap.

Next came a 12 mile race for stock chasses of 301 to 450 cubic inches. Aitken in a National led in the first lap, with Stillman in a Marmon 50 feet behind a close second. The Marmon, however, went out in the third lap, leaving the contest to Aitken, Dingley on a Chalmers, Lorimer in a Chalmers, and Disbrow in the Rainier. For the last three laps the National and two Chalmerses were less than 50 feet apart and Disbrow far behind. Results:

- t. Aitken, National, 10:07.65. 2. Lorimer, Chalmers-Detroit, 10:09.28.
- 3. Dingley, Chalmers, 10:10.13.

The sixth event proved to be a 10 mile stock chassis handicap battle, limited to cars of 231 to 300 cubic inches capacity, between Ray Harroun (Marmon), Knipper (Chalmers) and Matson (Chalmers), for two prizes, both cups, the Chalmerses having 15 seconds handicap over the Marmon. By the third lap the Marmon had overcome the lead of the Chalmerses and worked into first place, which position it maintained to the finish, gaining a lead of 50 feet over Matson, its nearest competitor, all three driving furiously. Results:

- Marmon, Harroun, 9:51.01.
- 2. Chalmers, Matson, 9:51.23. 3. Chalmers, Knipper, 9:51.27.

The seventh event was to have been a 2 mile free for all, best two out of three heats, but after the first heat, by unanimous consent of the drivers, it was decided not to run the other heats. Strang in his 200 horse power Fiat got away first with about 50 feet lead, while Christie got away last, but managed to overtake Robertson in the Fiat 60 on the back stretch. Results:

- Strang, Fiat, 1:34-47.
- Christic, Christic, 1:41.70. Robertson, Fiat, 1:42.30.
- The eighth event was a 6 mile race for

stock chasses of 451 to 600 cubic inches. Robertson drove the Fiat 60, Disbrow the Rainier 50, Harding the Apperson Jack Rabbit 50 and Aitken the National 40. Robertson got away first but was closely pressed by the other three cars. On the first lap Robertson led the field by half a mile, with the National, Rainier and Jack Rabbit running in a bunch in the order named. At the finish of the second lap Robertson led by at least a mile, which lead he held to the finish. Results:

- 1. Robertson, Fiat, 4:43.37.
- Aitken, National, 5:11-17.
- Harding, Apperson, 5:13.02.

Next came a 24 mile stock chassis race, open only to amateur drivers, with the Kriegshaber Trophy as the prize, and contended for by Travis in a Chalmers, Oldknow in a Buick, Rutherford in a Stearns, and Kiser in a Pope-Hartford.

The Buick went out in the second lap, and the Chalmers out on the back stretch of the fifth lap, leaving only the Stearns and Pope-Hartford in the race. On the eighth lap Rutherford in his Stearns lapped Kiser in the Pope-Hartford, and finished three miles and a half ahead on the final round. Results:

- 1. Rutherford, Stearns, 20:35.25.
- Kiser, Pope-Hartford, 23:44.53.

There were eight starters in the 50 mile free for all, the next event, and of these two, Harding in the Apperson Jack Rabbit and Lorimer in a Chalmers-Detroit, were destined not to finish through serious accident, though no one was injured. On the thirteenth lap the Jack Rabbit blew a tire, skidded and collided with the Chalmers, putting both cars out of the running, breaking one front wheel of the Blue Bird and disabling the Jack Rabbit. In this race Robertson, in a Fiat, broke, by more than 4 minutes, the record established by Aitken in a National, at Indianapolis, for 50 miles. Results:

- Robertson, Fiat 60, 40:14.02.
- Aitken, National 40, 43:11.41.
- Stillman, Marmon 35, 43:30.56.

Saturday's Races.

Saturday opened with a four mile amateur motorcycle race, in which there were three starters, viz., Seymour, Fahey and Klebes, all on Reading-Standards. Fahey was unable to get started and Klebes won in 3m. 22.19s. This event was to have been followed by a race for professionals, but the starter ruled the race off.

Then followed a 10 mile event for stock chassis of 161 to 230 cubic inches. There were but two starters in this, both Chalmers, driven by Knipper and Matson. Matson had to stop on the first mile with motor trouble and never got closer than 11/2 miles to Knipper again, who won in 10m. 41.06s., Matson finishing in 13m. 35.73s.

Strang then gave a 2 mile exhibition with a flying start, going the circuit in Im. 22.078.

The fourth event was a 10 mile handicap, in which started Arthur Chevrolet, Buick 30; Ray Harroun, Marmon 32; Matson, Chalmers 30, and Knipper, Chalmers 30. The two Chalmers had 30 seconds over the Buick and Marmon, these two being scratch men. Chevrolet drove a fast race from the beginning, and lapped the others in front of the grand stand in the third lap. In the eighth mile the Buick was leading a lap, while the Marmon had about overcome the handicap of the Chalmers cars, and finished in second place a wheel diameter ahead of Knipper's car, which was third. Results:

- 1. Chevrolet, Buick, 9:03.18. 2. Harroun, Marmon, 9:18.07.
- 3. Knipper, Chalmers, 9:18.09.

The fifth event was an 8 mile free for all handicap. There were five starters, viz., a Matheson, with Whalen driving, 1:40 handicap; Rainier, Disbrow, 1:10; National, Kincaid, I minute; National, Aitken, # seconds handicap, and Fiat 60, Robertson, scratch. In the second lap Kincaid's National lost a wheel. The Matheson pulled into the paddock at the finish of the third. Aitken in the National won by 9 seconds. Results:

- 1. Aitken, National, 7:42.73
- Disbrow, Rainier, 7:48.63.
- Robertson, Fiat, 7:59.50.

The sixth event was a 12 mile race for stock chasses 301 to 450 cubic inches, with four entries, as follows: Rainier, Disbrow; two Chalmerses driven by Lorimer and Dingley, and a Buick, driven by Louis Chevrolet. The Buick and both Chalmerses got away in a bunch, and on the finish of the first lap there was scarcely 100 feet between the first three cars. At the fmish Chevrolet led Dingley by 200 yards, Lorimet by 300 yards and Disbrow by 450 yards Results:

- Chevrolet, Buick, 10:12.66. Dingley, Chalmers, 10:28.83. Lorimer, Chalmers, 10:37.76.

The 6 mile stock chassis handicap, 231 16 300 cubic inches, had four entries and had the appearance of a fast contest. Knipper and Matson in Chalmers-Detroits and In seconds handicap, and Harroun was in hite 5 seconds over Arthur Chevrolet in Buick, but Chevrolet disqualified by ing before the signal. The Marmon allo a very pretty exhibition of driving by Harroun, made up the advantage of the Oul mers' handicap and finished first Re-

- 1. Harroun, Marmon, 05:40,83.
  2. Knipper, Chalmers, 05:42.
  3. Matson, Chalmers, 05:50.52.
- The last event of the several days' me cessful racing was a 200 mile race for stock chasses of 451 to 600 cubic inches

cylinder capacity. The first prize in

event was the City of Atlanta ny, valued at \$10,000 (which must won three times to become the rty of the entrant), and \$1,000 in gold, second prize was \$500 in gold; third \$300 in gold; fourth prize, \$200 in

ere were eleven entries, some of which been in nearly every contest during reek, and surely showed their mettle gain entering this grueling grind. were: Robertson, Fiat 60; Charles Renault 35-45; Disbrow, Rainier Lorimer, Chalmers 40; Hard-Apperson Jack Rabbit 50; Ding-Chalmers 40; Stillman, Marmon Louis Strang, Fiat 60; Chevrolet, 30; Harroun, Marmon 32, and L. Renault 35-45.

first 40 miles were covered in record by Robertson, Chevrolet and Strang. whom had lapped the other cars in ace at the completion of the fortymile. At the end of the fiftieth the four leaders were Robertson, olet, Strang and Disbrow. Roberttime for the first quarter of the race, 41:02.98, was far ahead of the d established by Oldfield at Indianwhich was 44:31.2. In the sixmile Lorimer, driving a Chalmers, ed out with axle trouble. In the sevighth mile Chevrolet had to stop on ack stretch for motor adjustment, but back in time to maintain his position cond.

cars were traveling at such a rate eed, and so bunched, that it was alimpossible to keep tab on any but eaders. At the end of the eightymile Chevrolet was forced to take uick out of the race, on account of nission trouble. At the one hundredth mark the order of running was Rob-, Strang, Disbrow, Stillman. Just completing his one hundred and ieth mile Strang blew a tire, stopped pits and changed the tire in less



RAINIER (DISBROW), WINNER OF ATLANTA TROPHY.

than a minute. At the end of the one hundred and twenty-second mile the Apperson Jack Rabbit, then in fourth position, was forced into the paddock with a broken spring. Strang continued to have tire trouble and went to the paddocks in the one hundred and twenty-sixth mile. At the end of his one hundred and sixty-second mile Robertson stopped for the first time. His car came to a standstill on the turn into the home stretch on account of a broken chain. As the Fiat was being repaired the Rainier, driven by Disbrow, shot into first place. Robertson finally completed his repairs and re-entered the race 8 miles behind Disbrow, but finished less than two laps behind. Results:

- 1. Disbrow, Rainier, 2:53:48.32.
- Robertson, Fiat, 2:57:47.05. C. Basle, Renault, 2:58:43:93.
- L. Basle, Renault, 3:13:41:87.
- Summary of the Week's Events.

The results of the Atlanta speed meet show several remarkable things. One is a record showing the winnings of the many makes of cars. Nearly every make entered figured "inside the money" during some oneor other of the races. The absence of any serious accidents was in itself remarkable, since every event was a fast one in which records were broken or equaled.

The manner in which the different events were handled, there being no unnecessary delay between them, was also a notable feature. There was only a minimum of tire trouble, though several of the cars seemed to be on the track continually. Notable among those who were constantly on the fly were the two Marmons, the two Chalmerses and the Rainier. Michelin tires were used on the winning cars in every event except the two amateur events. Rutherford, driving the Stearns and winning two events, used Fisk rims and bolted on tires. The following summary will convey some idea as to how the glory and the money were divided:

Fiat-9 firsts, 1 second, 2 thirds. Chalmers-Detroit-5 firsts, 11 seconds, 7 thirds. National-4 firsts, 5 seconds, 3 thirds. Marmon-4 firsts, 4 seconds, 3 thirds. Buick-4 firsts, 1 second, 2 thirds. Stearns-2 firsts, 2 seconds. Rainier-2 firsts, 1 second. Apperson-2 firsts, 3 seconds, 3 thirds. Benz-1 first, 3 seconds. Christie—2 seconds, r third. Matheson—r second. Pope-Hartford-2 seconds. Renault-3 thirds.

The various drivers who competed in the races signed a statement in which they highly praised the Atlanta Speedway, stating that the surface is all that could be asked, and that after the very hard test it had received during the week it was still in perfect condition. They also acknowledge the cordial treatment given them at Atlanta

### Portland (Ore.) Show Plans.

Plans for the annual automobile shows were discussed at a joint meeting of the Portland Automobile Club and the Dealers' Association held at the Commercial Club November 4. It was decided to hold the show during the last week in January. It is probable the Armory building will be selected for the exhibits, as on former occasions, providing suitable space can be allotted. If that cannot be done, a plan to hold the show on the ground floor of one of the new downtown skyscrapers now under construction will be considered. A show committee is to be appointed to take the arrangements for the show in hand.



STILLMAN (MARMON), WINNER OF SEVERAL EVENTS.

# The Los Angeles to Phoenix Race.

The last starter in the race from Los Angeles, Cal., to Phœnix, Ariz., a two cylinder, 20 horse power Ford, arrived at the finish three days and a half after the beginning of the race, after encountering and overcoming a multitude of accidents and mishaps. Of the ten cars that lined up at the starting line in Los Angeles at 10 p. m. on Saturday, November 6, not one came through without an accident or break, more or less severe, on the scarcely discernible desert trail by courtesy called road, but despite the damages sustained eight of the cars reached Phœnix and participated in the track races at the Territorial Fair. Though the roads were in no better condition than during the first race over the same stretch last year, the winning car, the Buick, driven by two brothers, J. and L. Nikrent, managed to reduce the running time from 30h. 25m. 33s. to 19h. 13m. 3s., a gain of 11h, 121/2m, over the record established by F. C. Fenner in a White steamer last year.

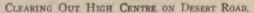
The condition of the roads over which the race was run can hardly be exaggerated. The first 109 of the 419 miles between Los Angeles and Whitewater do not .present great difficulties and make possible fair speed. Between Whitewater and Palm Springs in the desert washes and deep silt begin to make themselves felt, though the real fight with the desert trail does not begin until Indio is passed, where the trail leaves the railroad to strike off into the waste of the Colorado desert. For 94 miles the parallel ruts of the trail lead through silt as fine as flour in its texture, through gullies with almost sheer sides, across the dry beds of streams strewn with bowlders, over steep rocky or sandy grades, with puffs of alkali dust rising continually in front of the cars and blinding the drivers in the glaring desert sun. At one place the sand is so deep, the silt so tenacious that on a down grade not only has full power to be applied, but the mechanic has to get out and push. Not a human habitation is to be found along this entire stretch of almost 100 miles. Water is to be had in only two places-at Dos Palmos and Chuckawallawhere the checkers kept lonely vigil waiting for the racers. Bucking the fine silt on the low gear availed the racers not at all. By experience they learned that such a proceeding would only make the spinning wheels dig deeper and deeper into the silt, until in one case an inexperienced tourist endeavoring to go over the course was discovered by racing crews out on practice after his car had been buried more than 4 feet in the bottomless silt. Only by backing out of the silt that packs in front of the wheels and taking it on the intermediate gear could the drivers extricate themselves out of dozens of spots without recourse to the shovel.

The first stage of the race ended at Ehrenberg, a settlement of a few houses on the banks of the Colorado River, 248 miles from Los Angeles. Officials of the Maricopa A. C. checked the cars in as they arrived on the afternoon of Sunday, November 7, took charge of the cars and checked them out again at fifteen minute intervals beginning at 5:15 Monday morning, in the order of their arrival. During the time spent at the Ehrenberg control, and while being ferried in a scow across the river, no work was allowed on the car, and the taking on of water, gasoline and oil had to be done after the cars were checked out again. From the river to Phœnix the roads improved slightly and the worst of the high centres had been removed a week previous to the race, but at best the roads were a succession of bumps.

Trouble began almost immediately after the starting of the entries between 10 and 12 p. m. Saturday night. Though the Los Angeles police enforced the speed limits, fully 50,000 persons lined the streets, and automobiles had gone far into the country to catch a glimpse of the racers' headlights. In consequence of a false alarm a machine containing four spectators turned out of the road at full speed, struck a pole and hurled the occupants into the ditch, injuring one of them probably fatally. Before the racers had reached San Bernardino, & miles, the accidents began. When an automobile standing at a road intersection three its searchlight rays straight into the face of Rose, the Elmore driver, it blinded him, and in consequence he hit a culvert at full speed. The shock knocked loose every portion of the equipment not riveted to the car. Tools, provisions, spare parts, everything went overboard, but despite the loss the driver continued. The Pennsylvania and the Columbia, following in the wake of the Elmore, hit the wreckage. The Pennsylvania escaped with a sheared pin on a brake rod, losing an hour and a half in repain in San Bernardino. Despite the handicas the Pennsylvania was the third car to reach the Colorado River control, but more trouble at Vicksburg, in Arizona, forced it to drop into sixth place. The Elmore, after a game fight, limped into Phœnix Monday night with a patched transmission, the intermediate gear alone having escaped strip-

The Columbia also struck the wreckies, cracked its frame and stopped-for more than two hours in San Bernardino to patch the crack with a plate and bolts. The weakened frame notwithstanding. Driver Stone nursed his car along and landed in second place, making the run in 23h 35m 20s. The Studebaker E-M-F., driven by Bert Latham, landed in third place, th. 21m. behind the Columbia. To the Colorado River the little car escaped serious trouble but when it finished it had been running 70 miles without water, with the front axk badly bent on the rough roads. The Kisselkar broke a steering knuckle. The driver replaced the broken part after several hours' delay in hunting up the car of the owner, and continued, only to hit a rock between the river and Phoenix. It captured fourth place with a bent front axle and steering rod. The Dorris was put out of







THE WINNING BUICK ON THE EAST BANK OF THE COLORADO RIGHT.

the race when, in a narrow gulch, it hit the only tree, a willow, growing on the desert for many miles. It was disabled and gave up the race. The Franklin injured the housing of the rear axle near Palm Springs and returned to Los Angeles after repairs under its own power. The Ford smashed a wheel at the beginning of the desert trip, wired to Los Angeles for a spare wheel and

gamely kept on,

The fight for first honors between the winner, the Buick, and the Isotta-Fraschini did not end until Phœnix was almost in sight. At Mecca, where the racers left the railroad and struck into the wilderness, the Isotta was thirty-five minutes ahead of the Buick in elapsed time; but the splendid driving of the Nikrena brothers told in the desert run, and at the river the Buick had gained forty minutes over the imported car. On Monday morning the Isotta started east at 5:15. with the Buick following fifteen minutes later. Both cars had escaped accidents so far and both struck a terrific clip over the rough road, regardless of high centres, in an effort to get in first. At Quartzite, 19 miles from the river, the Isotta stopped to change a tire, and the Buick overtook it. Four times the cars changed position. The Buick lost four screws out of the false bottom containing the oil below the crank case, lost 6 gallons of oil and had to stop twice to take on a new supply. It lost the road and ten precious minutes, but the Isotta also had its share of trouble. The imported car broke the feed pipe to the carburetor, and, as a result of striking a high centre, it bent its front axle and had to be towed into Phœnix the last 4 miles, arriving 3h. 23m. after the leader. The judges disqualified the Italian car, and as a result second place went to the Columbia.

As we go to press our Los Angeles correspondent writes as follows:

"After a number of consultations the officials of the Maricopa A. C. decided to award second place to the Isotta, the entry of the Motor Car Import Company, the head of which concern, F. C. Fenner, was the winner of last year's race. The Isotta was towed in the last few miles of the race, but since Rule 7 provides that contestants may use any means except transportation on a railroad to reach the finish line, it was decided that the towing of the disabled car did not disqualify the entry. By the decision the Columbia entry moves from second to third place, the Studebaker E-M-F from third to fourth and the Kisselkar from fourth to fifth place. Fenner did not protest the ruling of the judges when they unofficially disqualified his entry, and the unofficial action was set aside voluntarily.

"The official figures increase the running time of the winner, the Buick, from 19h. 13m. to 19h. 40m."

Entry blanks have been issued for the Fort Lee (N. J.) hill climb to be held Thanksgiving Day.

#### Business Opportunities.

Howard Case & Co., Lethbridge, Alberta, have sold out certain branches of their original business, with the intention of devoting their whole time to the automobile and are prepared to consider district or provincial agencies for medium priced touring cars. They would also like to hear from manufacturers of high wheel motor bug-

#### A. C. of Vermont Annual Meeting.

The A. C. of Vermont met at the Pavilion Hotel in Montpelier, Vt., October 21, for its annual meeting. The election of officers resulted as follows: President, W. W. Brown, of Springfield; first vice president, James M. Boutwell, of Montpelier; second vice president, Dr. J. Holmes Jackson, of Burlington; secretary and treasurer, S. S. Ballard, of Montpelier; director, G. H. Morrill, of St. Johnsbury. The date of holding the annual meeting was changed from the third Thursday in October to the first Saturday in September. A vote of thanks was tendered Hon. C. W. Gates, the State Highway Commissioner, for the efficient manner in which he has conducted improvements upon the highways of the State the past year. The club voted to L. H. Greene the sum of \$50, as compensation for his faithful labors as secretary and treasurer the past year. It was voted to start a campaign for the erection of danger signs and direction signs.

#### Recognized Automobile Clubs to Discuss Racing Question.

The recognized national automobile clubs will hold a joint conference at Paris on December 7, at which time general rules for automobile racing during the season of 1910 will be decided upon. The Automobile Club of America, the recognized club in this country, has been consulting with the Motor Contest Association regarding suggestions to be offered by the club's representative at the Paris conference. It is believed that the club will urge that in future all' international road races be restricted to stock chasses.

#### Three New Member Clubs for A. A. A.

Three new clubs were elected to membership in the A. A. A. at the regular monthly meeting of the executive committee in New York, viz., Atlanta A. A., of Atlanta, Ga.; Waco A. C., Waco, Tex., and the Rowan County A. C., of Salisbury. N. C. At the same time reports were received indicating that work is progressing toward the formation of State associations in Texas, North Carolina, Alabama and Florida. Ralph W. Smith, president of the Denver, M. C. and the Colorado State A. A., was named a member of the A. A. A. executive committee.

#### Speed Trials on Indianapolis Speedwav.

About one-half of the brick roadway of the Indianapolis Motor Speedway has been completed, and it is expected the remainder will be finished early next month. E. A. Moross, director of contests of the speedway, while attending the Atlanta race meet announced that on December 11 an attempt would be made to break all world's records from 1 mile to 1,000 miles by such drivers as Strang, Oldfield, Christie and others.

#### Coming Events.

November 6-17-San Antonio, Tex., Race Meet,

San Antonio A. C.
November 14-17—San Antonio, Tex., Four Day
Track Race, San Antonio A. C.
November 20-21—New Orleans, La., Two Day

Track Race, New Orleans A. C.

November 22-Flag-to-Flag Reliability Run, from

Denver to City of Mexico.

November 25—Redlands, Cal., Hill Climb, Mile Hill Climb Association.

December 12-San Antonio, Tex., Annual En-durance Contest, San Antonio A. C.

December 25 to January 1-Columbus, Ohio, Automobile Show, Auditorium.

December 29-30-Philadelphia (Pa.) Annual Midwinter Endurance Contest, Quaker City M. C.

December 31 to January 7-New York City Annual Show, Grand Central Palace, American Motor Car Manufacturers' Association.

January 8-15-New York Annual Show, Madison Square Garden, Association of Licensed Automo-

bile Manufacturers,
January 10-16—Portland, Ore., Annual Automobile Show.

January 15-29—Philadelphia, Pa., Automobile Show, Second Regiment Armory.

January 24-29-Detroit, Mich., Automobile Show,

Wayne Hotel Gardens. February 4-6-New Orleans, La., Annual Mardi Gras Speed Carnival, New Orleans A. C.

February 5-12—The Ninth Annual National Show at Chicago, Ill.

February 14-19—Buffalo, N. Y., Automobile Show, Broadway Arsenal, A. C. of Buffalo.

February 14-21-St. Louis, Mo., Annual Auto-

mobile Show, National Guard Armory.
February 19-26—Newark, N. J., Automobile Show, Essex Troop Armory. February 19-26-Salt Lake City, Utah, Automo-

bile Show, Auditorium.

February 21-26—Binghamton, N. Y., Automobile Show, State Armory.
February 22-26—Kansas City, Mo., Fourth An-

nual Show, Convention Hall, Kansas City Automobile Dealers' Association.

February 22-27-Milwaukee, Wis., Automobile Show, Auditorium, Milwaukee A. C. March-Denver, Col., Automobile Show, Denver

March 5-12-Boston, Mass., Automobile Show, Mechanics Building, Boston Automobile Dealers' Association

March-Rochester, N. Y., Automobile Show. March-Syracuse, N. Y., Automobile Show.

#### Foreign Events.

November 12-20-Annual Olympia Automobile Show in London, England.

November 19-27-Thirty-third Annual Stanley Show of Motor Vehicles in Agricultural Hall, London, England.

December 5-19—Reliability Trial for Light Cars, under direction of L'Auto, Paris,
January 28 to February 5—Automobile Exhibition at Waverley Market, Edinburgh, Scotland, under direction of Scottish Motor Trade Associa-

### THE FIELD OF COMMERCIAL APPLICATIONS.

#### Motor Police Patrol for Washington, D. C.

The H. H. Franklin Manufacturing Company have recently delivered to the police department of Washington, D. C., a motor police patrol notable for the completeness of its equipment. It has an 18 horse power engine, Bosch high tension magneto and pneumatic tires. The car body is of Prussian blue, with Usatonia red running gear; the panels are of three ply bent wood; the body is of strong and light construction. The upper part is entirely encased with wire grille work; the rear part is protected on all sides with curtains. The driver is protected from the weather by a glass front, by a mackintosh apron and by side curtains.

The vehicle is fully equipped to serve as a temporary ambulance. The cushions on the inside seats are removable and the seats are hinged so as to lift and provide space for stretchers and other paraphernalia. The space under the seats is accessible by small doors in the rear of the body. There is a medicine chest under the driver's seat, and another compartment for supplies back of the seat, accessible from the inside of the body. Two brass lanterns are instantly detachable, but are held securely against rattling when in place. The car is equipped with an 11 inch gong.

The pneumatic tires, 37x5 inches in size, are specially large for this comparatively light vehicle, thus insuring durability. Pneumatic tires have been placed on Franklin commercial cars after an experience with both solid and pneumatic tires. In front

the vehicle has full elliptic springs and at the rear semi-elliptic and coil. The weight of the car, fully equipped and with gasoline and oil, is 2,980 pounds.

#### Commercial Notes.

The authorities of Savannah, Ga., have decided not to buy any more horse drawn fire apparatus,

J. F. Hunt, of Waterville, Wash, who operates several stage routes out of Waterville, will replace his horse drawn vehicles with automobiles.

The city of Houston, Tex., has ordered a combination automobile chemical fire engine, capable of carrying a crew of nine men, which is to be delivered early in the winter.

The Pueblo (Col.) Automobile Company has placed in service a new combination passenger and freight automobile. The passenger body is capable of accommodating sixteen passengers, and may be replaced with a truck body for hauling baggage, etc.

Work has been completed on the new road between Valdez and Fairbanks, Alaska, and an automobile mail service will be inaugurated between these two points. A ferry is in operation across the Tazlina River, which is encountered on this northern roadway.

Tacoma, Wash., has recently received a 75 horse power automobile chemical and hose wagon, which negotiates some of the steepest hills in fast time. The city commisioner has also advertised for bids on two automobile fire engines and two ordinary steamers.

The Compeer Cigar Company, of Indianapolis, has placed an order for fire one cylinder runabouts to be used by incity and road salesmen. This is the company's first venture with automobiles in us business, but later, it is understood, the company will add one or two gasoline delivery wagons.

#### Parts Manufacturers Consolidate.

The Muncie Clutch and Gear Company, of Muncie, Ind., and the Wabash Ger Works, of Terre Haute, Ind., have been consolidated. The Muncie Clutch and Gar Company is a new firm, having been in business only for a few months, while the Wabash Gear Works has been operating some years. The business will henceforth be mder the control of A. W. Wagner, president and manager of the Terre Haute Malleible and Manufacturing Company, who has become president of the Wabash Gear Works in reorganization, and H. L. Hooke, formerly of Muncie, Ind., who becomes the secretary. The consolidated firms will continne the manufacture of automobile parts, such as transmission gears, progressive and selective control levers, clutches, etc.

President Clarke S. Drake of the Milwaukee (Wis.) A. C. has been appointed general manager of the Milwaukee automobile show, to be held from February 22 to 27, inclusive, in the Milwaukee Auditorium. Allotment of space will begin January 26. Pleasure cars will occupy Section A, spaces 20x20 feet costing \$125.







REAR VIEW.

### AUTOMOBILE LAW AND LEGAL EVENTS.

# Chauffeurs to Be Bonded in Louisville.

The City Council of Louisville, Ky., recently passed a measure which requires all chauffeurs to be registered and to furnish a bond for \$2,000. The registration fee is \$3 a year, and the bond costs the chauffeur \$40 a year. This measure was passed at the instance of the Sinking Fund Commission, and took the place of a former ordinance advocated by the Louisville A. C., which also required chauffeurs to take out a license at \$3 a year and to furinsh a bond for \$500. Under the new ordinance the bond must be furnished by a bonding company, which makes it quite expensive, while the \$500 bond provided for in the old ordinance would have cost only \$5 a year to carry. The ordinance has not yet passed into effect, and the Louisville A. C. held a meeting on November 9 to discuss the new ordinance and protest against it.

# To Test Washington, D. C., Wheel Tax Ordinance.

Le Roy Mark has filed in the Supreme Court of the District of Columbia a petition for a writ of certiorari, with the object of testing the constitutionality of that section of the District appropriation bill for the fiscal year ending June 30, 1910, imposing a wheel tax on automobiles in the District of Columbia. Mr. Mark contends that the present statute amounts to double taxation, as Congress in 1903 passed a law imposing a personal property tax of 11/2 per cent. ad valorem on autos, etc. He states that there are now 4,532 automobiles in the District, and that the District Government would derive about \$27,000 from the wheel tax. It has been found that the statute creating the wheel tax is defective, in that it does not provide a penalty for nonpayment.

#### No Provision for Highway Maintenance in Ohio.

All improved highways of the State of Ohio are left without any provision for their care and maintenance by a decision of the Ohio Supreme Court handed down recently. Conflicting and special laws under which pikes have been cared for a score of years were swept away by the court's decision, and the Legislature will be called upon to enact a law to fill the void. The case was that of Thorniley, auditor, and Kerr, treasurer, of Gallia County, against the State of Ohio, in which the court held that the Gallia County commissioners are not entitled to draw pay as a board of turnpike directors. The decision upholds the opinion of Attorney General Denman.

#### Business Troubles.

Lindsay Russell has been appointed receiver for the Ennis Rubber Manufacturing Company, 165 Broadway, New York, with a factory in Newark, N. J. The company was financed by Thomas A. Ennis, of the failed brokerage firm of Ennis & Stoppani, who advanced \$86,000 to the company and held \$50,000 of its capital stock. The company was incorporated under New York laws with a capital stock of \$50,000 to manufacture a flat tread automobile tire, and Fred J. Ennis, son of Thomas A. Ennis, was president. It is stated that the assets are \$15,000 and the liabilities \$130,000.

#### Indiana Registrations.

Figures taken from the record of the Indiana Secretary of State throw some interesting light on the automobile situation in that State. During the present year there have been 5,795 new registrations to November 1, as compared with 3,317 registrations during the first ten months of last year. The comparative figures are as fol-

•	1908.	1 90 <b>9</b> .
January	54	93
February	44	138
March	198	536
April	361	831
May	443	877
June	565	933
July	544	795
August	485	716
September	413	497
October	210	379

# Dust Preventives to Be Used in Milwaukee.

The city of Milwaukee, Wis., will use 200,000 gallons of a petroleum by-product, known as asphaltum oil, for treating the streets and parkways next season. An order has been placed with the Standard Oil Company for this amount. A receiving and distributing station has been built in Riverside Park. The cost will be borne by property owners, as water sprinkling now is. The latter method costs owners of property about \$1 a season, while one application of oil, sufficient for a season, will cost only from 60 to 85 cents.

#### Traffic Census in Massachusetts.

The Massachusetts Highway Commission has been taking a census of the vehicles using the improved roads of the State. The first enumeration began August 22, and the count was made from 240 stations. For that week there were 37,591 horse drawn vehicles to 27,309 automobiles. In another count beginning October 10 were found 34,423 horse drawn vehicles and 18,500 automobiles of all kinds. The percentages changed from 58 of teams to 42 of automobiles in August, to 65 of teams and

35 of automobiles in the month just closed. While the single horse, light and heavy vehicles were in a large majority, there were almost three times as many touring cars as runabouts in the automobile showing.

# Star Motor Car Company to Build Cars in Indianapolis.

Within a short time the eleventh automobile factory in Indianapolis will be established by the Star Motor Car Company. This company has just been organized with an authorized capitalization of \$100,000 and will manufacture a five passenger touring car and a line of trucks and delivery wagons. The officers are: Guy G. Shaw, president; Dr. J. W. Berauer, vice president; S. J. Summers, secretary, and W. A. Rowland, treasurer. Other directors are J. A. Diggle, J. F. Morgal, H. B. Canine, George V. Bedell, Nicholas Noe, C. J. Olson and Charles Brown. It is the company's intention to build a factory as soon as a site can be agreed on. The first cars will be brought out about January 1.

#### Auto Instruction in Indianapolis.

A number of automobile men have arranged to establish a school of instruction in Indianapolis, to be known as the Indiana Automobile College. The second floor of the building at 27-33 North Capitol avenue, formerly occupied by the Indiana Carriage and Automobile Company, has been leased, and classes will be started in repairing, assembling, driving, drafting and other branches of the industry. It is also the intention to establish night classes for those who cannot attend during the day. These classes will be held Monday, Wednesday and Friday evenings. Some time ago the Indianapolis Y. M. C. A. attempted instruction in automobile lines, which did not prove successful, and the classes were abandoned.

# Public Building for Dead Auto Storage.

Milwaukee automobile owners have been offered the use of the basement of the new \$500,000 Milwaukee Auditorium for storing their cars during the winter. The governing board has issued a circular describing the advantages of the fireproof basement. This is a new departure, and the revenue is to assist in maintaining the big public hall, which is still governed by a board of citizens representing contributors to the \$250,000 building fund. The city appropriated the remaining \$250,000 to erect the building.

The latest issue of the Reo Echo, the house organ of the Reo Motor Car Company, of Lansing, Mich., contains the 1910 announcement of the company.

### GARAGE AND SALESROOM.

#### Garage Notes.

LEBANON, IND.—Alfred and Will Lofland's garage and machine shop was destroyed by fire last week. It was insured for \$1.800.

ELGIN, Tex.—John Puckett will open a garage in W. T. Sewell's new brick building on Main street as soon as it is ready for occupancy.

AKRON, OHIO.—Martin Brothers have purchased the Wickware Building on Main street, which they will remodel for a garage and machine shop.

TOLEDO, OHIO.—The Twenty-third Street Garage Company has been incorporated with a capital stock of \$35,000 to conduct a garage and sales agency business. George C. Craig is the moving spirit.

JACKSONVILLE, ILL.—The new Estaque Garage, on West Court street, has been completed. S. R. Southerland, formerly with the Olds Motor Works, will have charge of the new establishment.

CHEYENNE, WYO.—Frank V. Wright, formerly proprietor of the Capitol Garage, has moved to Denver, Col., where he has purchased an interest in the Place Garage Company, at 1453 Clarkson street.

Los Angeles, Cal.—Blinn & Kumchan, agents for the Welch car, have secured a six years' lease on a garage now in course of erection at Nos. 1246-8 South Flower street. The building will be 50x150 feet and will cost \$12,000.

MINNEAPOLIS, MINN.—George D. Dayton is having plans prepared for the erection of a one story pressed brick and concrete garage on Tenth street and Mary place. The building will be 125x158 feet, with steel truss roof, to cost \$15,000.

COLUMBUS, OHIO.—Dr. L. M. Early has leased a 40x187 foot room at Town and High streets, in the old Lazarus Building, and will open a salesroom for the Rambler, Babcock electric and several other lines. In a few days the Early Motor Car Company will be incorporated to take charge of the business.

OMAHA, NEB.—The Capron-Wright Company have been organized with a capital stock of \$25,000, and have secured temporary quarters in the Paxton Block pending the completion of their salesrooms on Farnam street. The company will handle the Moline, Speedwell and other lines. O. J. D. Capron is president of the new company and E. E. Wright treasurer.

COLUMBUS, OHIO.—The Madison County Automobile Company, of London, Ohio, was incorporated recently by W. E. Jones, W. J. Boyd, R. W. Mead, W. H. Riddle, M. L. Burnham and J. Scott Chenoweth for the purpose of conducting a garage business and sales agency. The brick building formerly used as a livery stable by Burnham & Gordon has been leased for the ga-

rage. A number of different cars will be handled.

PORTLAND, ORE.—The Standard Motor Car Company have entered the Portland field for the purpose of handling the Ford car, and will be temporarily located at 86 Tenth street.

SACRAMENTO, CAL.—Joseph Ollier has sold his interest in the firm of Ollier & Worthington to Leon T. Shettler, a well known Pacific Coast dealer, and the firm will henceforth be known as Shettler & Worthington Company.

CANANDAIGUA, N. Y.—E. T. and H. E. Semans have purchased a property at the corner of Phœnix street and Lafayette avenue, 57x155 feet, upon which they will erect a garage and repair shop in which to conduct a general automobile agency, repair and rental business. The building will be concrete construction, and will cover the entire lot, 8,850 square feet; it will be steam heated and electrically lighted, and will cost about \$9,000.

COLORADO SPRINGS, COL. — Albert W. Marksheffel, for several years proprietor of the Colorado Automobile and Supply Company, has bought out the Miller Automobile Company. He will amalgamate the two concerns under the name of the Colorado Auto and Supply Company and will move to the Miller Garage, where he will conduct a general automobile and repair business. He is the agent for the Ford and Speedwell cars.

#### New Agencies.

UTICA, N. Y.—I. R. Gardinier, Franklin. ARCADIA, WIS.—Geo. Bohrnstedt, E-M-F. BELLINGHAM, WASH.—R. P. Rice, Ford. GRAND RAPIDS, MICH.—J. Dwight, Velie. ST. CLOUD, MINN.—The Grinols Co., Ford. CLEVELAND, OHIO.—C. F. Condon, Badger. ST. LOUIS, MO.—James J. McDonald, Knox. PERRY, N. Y.—Geo. H. Peddle, Great Western 30."

LOS ANGELES, CAL.—Ralph J. Leavitt, Renault.

WASHINGTON, D. C.—Flynn Motor Car Co., Stearns.

INDIANAPOLIS, IND.—Rambler Auto Co., Rambler.

HELENA, OHIO.-J. F. Metzler, Great Western "30."

PORTLAND, ORE.—The Standard Motor Car Co., Ford. LOS ANGELES, CAL.—H. O. Vogel, Great

Western "30."
DULUTH, MINN.—William Buchanan, Inter-

state, Peerless.
HARTFORD, CONN.- Foster & Co., 183 Allyn

street, Rambler.
NICHOLASVILLE, KY.—C. A. Kenny, Great Western "10."

PORTLAND, ORE.—Polson Implement Co.,
American Roadster.

SHELDON, ILL.—The Sheldon Automobile Garage, Great Western.

HARRISBURG, PA.—The Keystone Motor Car Co., Kline Kar. INDIANAPOLIS, IND.—Royal Wilke, 439

Tenth street, Winton.

DETROIT, MICH.—The Neal-Kitchel Motor Sales Co., Parry car.

PERU, IND.—O. B. Shutt, Great Western "10."

LONE GROVE, IA.—H. W. Meier Auto Co., Reo.
YOUNGSTOWN, OHIO.—E. J. Davis Sons,

Lozier.

MARSHFIELD, WIS.—Lang & Scharmann.

Maxwell.
CLEVELAND, OHIO.—Joseph H. Greenwald.

CLEVELAND, OHIO.—Reeves Motor Car Co.,

Detroit electric.
CINCINNATI, OHIO.—Chas. Behlen Sons Co.,

Bailey electric.
WATERTOWN, WIS.—Edward G. Buroff, 418

Main street, Buick.

JAMESTOWN, N. DAK.—The James River

Motor Co., Hudson.
WOONSOCKET, S. DAK.—The Schuyler-Me-

Curdy Auto Co., E.M.F. ST. LOUIS, MO.—Albert Stearne Motor Car Co., Great Western "30."

PORTLAND, ORE.—The Crowe Automobile
Co. of Portland. Thomas Flyer.

PHILADELPHIA, PA.—The Motor Supplies Co., 615 North Broad street, Empire "so." COLUMBUS, OHIO.—Central Ohio Motor Car

COLUMBUS, OHIO.—Central Ohio Motor Car Co., 61 East Spring street, Oakland and Oldsmobile.

BOSTON, MASS.—The Hub Automobile and Renting Co., 366A Columbus avenue, Pullman and Black Crow.

#### Trade Literature Received.

R. L. Morgan Co., Worcester, Mass.—Specifications of the Morgan 5 ton motor truck. The Waverley Co., Indianapolis, Ind.—Catalogue

of Waverley electrics for 1910.

Peerless Motor Car Co., Cleveland, Ohio.—Catalogue of the Peerless 1910 models.

Matheson Motor Car Co., Wilkesbarre, Pa.— Catalogue of the Matheson 1910 models. Murphy Electricity Rectifier Co., Rochester, N. Y.—Catalogue of the Murphy electricity rectifier.

W. H. McIntyre Co., Auburn, Ind.—Catalogue of the McIntyre motor buggy models for 1910.
Flavius G. W. Sudrow, 64 Chapin Block, Buffalo, N. Y.—Catalogue of the American Auto

Acheson Oildag Co., Niagara Falls, N. Y.— Booklet entitled "Oildag, Its Merits as a Lubricant"

Garage Equipment Manufacturing Co., Milwakee, Wis.—Catalogue of the company's automobile specialties.

S. Wohlfeld & Co., 538-540 North Third street. Philadelphia, Pa.—Circular of Wohlfeld's waterproof tire trunk.

Dover Stamping and Manufacturing Co., Cambridge, Mass.—Catalogue No. 11 of Dover automobile specialties.

Davis-Bournonville Co., 90 West Street, New York.—Catalogue of the company's oxy-acetylene welding and cutting apparatus.

The Biddison Manufacturing Co., Madison, Wa.—Catalogue of mechanical force feed lubricators for gas, gasoline and oil engines.

The American Oil Pump and Tank Co., Dayton, Ohio.—Catalogue of the company's self measuring oil pumps and tank outfits.

The Gilbert Manufacturing Co., New Haves, Conn.—Advance catalogue of Gilbert motor or accessories for the season of 1910.

S. Strunz & Son, 708 Bingham street, Pittsburg.
Pa.—Booklet entitled "How to Preserve the Bessty
of Your Automobile," expounding the merits of

Chalmers-Detroit Motor Co., Detroit, Mick.—Folder entitled "The Consistent Car," giving the record of the Chalmers-Detroit "40" in the Fairmount Park race in which it won the Consistency prize and finished second. A number of photographic views of the race are also shown.

# NOTES OF THE INDUSTRY AND THE SPORT.

#### Miscellaneous Notes.

The Motor Supply Company has been organized in Boston to deal in second hand cars.

The Muncie Gear Works, Muncie, Ind., have succeeded the High Wheel Auto Parts Company.

The Covert Motor Vehicle Company, Lockport, N. Y., have just completed a new two story 150x50 feet addition to their factory on Grand street.

Sheriff W. J. Bates, of St. Louis County (Duluth), Minn., is urging the purchase of a motor patrol for transporting prisoners between the jail and the new court house.

Thomas B. Jeffery & Co., Kenosha, Wis., announce that they will manufacture 2,500 cars during the coming year, which estimate appears quite conservative, considering the immense size of the Rambler plant.

The Phœnix Auto Supply Company of St. Louis have moved to their new building at 3974-6 Olive street, and are utilizing their former building as a wholesale office. They have also opened a branch in Kansas City.

The Michigan Steam Motor Company, Pike and Garland streets, Detroit, Mich., have begun the manufacture of steam trucks equipped with the steam motor which has been manufactured by the company for some time.

Ralph Owen, formerly with the Olds Motor Company, is to be head of a new company to be formed in Detroit with a capital stock of \$500,000, and to be known as the Owen Motor Car Company. The new concern will manufacture a four cylincar.

The Great Southern Automobile Company has been organized at Birmingham, Ala., and is remodeling an old cotton mill at the corner of Third avenue and Eighth street, that city, as an automobile factory. The car to be turned out is to be known as the Great Southern.

The Buffalo Auto Truck and Motor Company have purchased a two acre site, with a concrete factory building, in Leicester, near Mount Morris, N. Y. The factory will be reconstructed, after which the manufacture of motor trucks and delivery wagons will be taken up.

The Waldron Runabout Company, of Waldron, Ill., will shortly occupy a 50x100 feet addition to its plant, and then enter actively into the manufacture of runabouts and business vehicles. A. C. Gaylord is superintendent of the plant and E. O. Parker general manager of the company.

The Ewing Automobile Company, of Geneva, Ohio, which is now controlled by the General Motors Company, will start up again after having been idle for some months. It appears that when the General Motors Company secured control of the

concern the plan to remove to Easton, Pa., was given up.

The Behen-Faught Motor Car Equipment Company, of St. Louis, Mo., have opened a distributing depot at Farmington, Mo., in charge of Frank Kingston.

The Motor Accessories Association of St. Louis, Mo., has obtained a legal opinion to the effect that it can legally maintain a "dead beat" list for the use of its members.

The Tacoma (Wash.) Auto Drivers' Association has recently been organized with S. Blanchard as president, Guy Younie treasurer and Oscar Selzberg conductor. The association now boasts of thirty-five members.

The E. W. Clark Motor Company is successor to the Worthing-Clark Auto Company, of Fond du Lac, Wis. A reorganization has been effected, George W. Worthing retiring. The capitalization is increased from \$20,000 to \$30,000.

The Motor Supply Company, of Cleveland, Ohio, have built new offices and a new tire repair room, with additional equipment for the handling of the Empire tires, Stewart speedometers, Morgan tire chains and Galvin wind shields, for which they are distributors. The store has now an arcade running from Euclid avenue to Huron road.

The dealers of Wichita, Kan., plan to hold an automobile show in connection with the convention of the Southwestern Kansas and Oklahoma Implement and Hardware Dealers' Association December 7, 8 and 9. No building has as yet been selected for the exhibition, but it is believed that at least twenty dealers will take part.

The hill climb on the Edgewater-Fort Lee hill, across the Hudson River from New York city, on Thanksgiving Day morning, has been definitely decided on. The Edgewater-Fort Lee Motoring Society was organized for the purpose at a meeting held in the Casino Hall in Edgewater, N. J. W. J. Morgan is the representative of the society in New York.

The automobile truck department of the Brodesser Elevator Company, of Milwaukee, Wis., has been incorporated under the name of Brodesser Motor Truck Company. The elevator plant at Weil and Burleigh streets, Milwaukee, is being devoted almost entirely to the manufacture of motor trucks. The capital stock of the new concern is \$125,000. Peter H. Brodesser is president and general manager.

The Thermoid Rubber Company, Trenton, N. J., have just completed a new building of brick and steel construction. 120x120 feet, and two stories high. This building will be devoted entirely to the manufacture of automobile accessories and parts, such as brake lining, tubings, shoes, inner tubes and bumpers. All of the ma-

chinery in the new building is motor driven. Another building of the same dimensions is now under consideration.

The automobile dealers of Omaha and Council Bluffs, Ia., have agreed to hold an automobile show during the last week of February, and have formed a permanent organization for the purpose, of which Clarke Powell is secretary. There are now thirty-three automobile dealers in Omaha and three supply dealers.

The dealers of Cincinnati, Ohio, will hold their second annual show in the Music Hall February 21-28, under the auspices of the Cincinnati A. C. Gus W. Drach has been appointed chairman of the show executive committee, which also comprises J. K. Merkel and Geo. W. Cleveland. Ten other committees have also been appointed.

The Maxwell-Briscoe Motor Company, Tarrytown, N. Y., have acquired the Tarrytown Tire Works factory, which gives them 62,520 square feet additional floor space. This factory is already in operation. The company now control six plants, and upon the completion of those now in process of erection will employ nearly 6,700 people.

The Spalding Manufacturing Company, Grinnell, Ia., are erecting a three story 60x220 foot brick building, which will be devoted to the manufacture of automobiles. For 1910 the company will build about 200 cars in two models, a 30 horse power car with planetary transmission and a 40-45 horse power car with sliding gear transmission

We are informed that a Stoddard-Dayton car, Model 10-H, won the *Light and Gazette* endurance run from San Antonio to Dallas, Fort Worth, Austin and back to San Antonio, Tex., a total distance of 736 miles; that it secured a perfect road score, but was penalized 2.6 points by the technical committee. None of the other contestants finished with a perfect road score.

The American Society of Mechanical Engineers will hold its annual meeting in the Engineering Societies Building, 29 West Thirty-ninth street, New York, December 7-10. A considerable number of technical papers will be read at the meeting, and several reports will be submitted by committees of the gas power section. For Wednesday afternoon, December 8, an excursion is planned.

The Philadelphia Automobile Trade Association has secured the Third Regiment Armory, Broad and Wharton streets, for a period of two weeks, from January 15 to 29, for its annual show. Owing to the inadequate size of the building it will hold its show in two instalments, as it were, each of one week's duration, all commercial and some pleasure cars being shown the second week. The committee in charge

of the show this year consists of President Wister, W. F. Foss and James L. Gibney.

The latest addition to the firms engaged in the automobile business in Detroit is the Dearborn-Detroit Motor Company, whose organization was reported last week.

The E. Z. Auto Go-Cart Company, which recently moved its plant from Beloit, Wis., to Monroe, Wis., following its reorganization, has appointed Henry Gottstein, of Beloit, as general superintendent.

#### Club Notes.

It is reported that the A. C. of Canada has decided to take up aviation, and will in future be known as the Automobile and Aerial Club of Canada.

The recently organized Austin (Tex.) Motor Club has appointed a committee to confer with Mayor Woolbridge and other city officials regarding more satisfactory municipal automobile regulations.

The A. C. of Delaware County, Pa., is offering a reward of \$100 for the arrest of the driver of an automobile who ran down and seriously injured a man on Westchester Pike on November 6, and then escaped in the darkness.

The annual meeting of the American Automobile Association will be held at the Hotel Belmont, in New York city, on November 30, and the first meeting of the new board of directors for the election of officers will be held on the following day, December 1.

The Chattanooga (Tenn.) A. C. at a meeting held on November 5 appointed a committee to look into the matter of municipal automobile regulations in other cities and draw up an ordinance based on the results of their research for submission to the City Council.

The Upper Westchester A. C., of Ossining, N. Y., plans to conduct a hill climb on the Sunset Hill near that village on Thanksgiving Day, starting at 10 a. m. There will be events for different classes according to price, as well as for stripped stock chasses, and a free for all and a steam car event.

The New Jersey Automobile and Motor Club, of Newark, has appointed a special committee, with Joseph H. Wood as chairman, to look around for more commodious quarters, as the present clubhouse at Park place and East Park street has become inadequate with the growth in membership.

The Wisconsin State A. A., at its meeting in Milwaukee last week, elected the following officers for the ensuing year: M. C. Moore, Milwaukee, president; F. P. Hickson, La Crosse, and H. L. Halverson, Whitewater, vice presidents; G. A. West, Milwaukee, treasurer, and J. T. Drought, Milwaukee, secretary.

The A. C. of Hartford, Conn., at a meeting held on November 9, criticised the manner in which the improved roads of Connecticut are being constructed, and it appeared that there was considerable bad feeling between the club and the State Highway Commissioner. It was stated that the

new Berlin turnpike. which was opened recently, is rapidly being destroyed and should be oiled at once.

The A. C. of St. Louis, which withdrew from the A. A. A. about two years ago because it could not get a sanction for a race in the vicinity of St. Louis, has returned to membership in the national organization, and an application for membership has also been received from the Detroit Motor Club.

The Worcester (Mass.) A. C. plans to repeat its annual endurance run about December 16. Official observers will be carried this year on all cars, and the members of the engineering class of the Worcester Polytechnic Institute will be asked to officiate. The event will consist of two or three daily runs of about 200 miles each.

The A. C. of Maryland held a meeting at its clubrooms, 12 West Mt. Royal avenue, Baltimore, on November 9, at which a resolution was passed recommending the following maximum tax rates for automobiles: Care of less than 20 horse power, \$6 per year; between 20 and 30 horse power, \$9; between 30 and 40 horse power, \$12; above 40 horse power, \$15.

The Chicago A. C., at a meeting held last week, passed a resolution urging the city government to properly safeguard the approaches to the bridges over the Chicago River. It is claimed that red lights and bells are not a sufficient warning, especially to strangers in the city, and the provision of gates that close automatically every time the bridge is opened has been suggested.

#### New Incorporations.

The Kentucky Quick Repair and Automobile Company, Cincinnati, Ohio.—Capital stock, \$12,000.

The Oklahoma Automobile Company, Enid, Okla.—Capital stock increased from \$10,000 to \$25,000.

Virginia Motor Car Company, Inc., Roanoke, Va.—Capital stock, \$25,000. Incorporators, W. P. Crumpacker and James Frantz.

Tidewater Automobile and Garage, Richmond, Va.—Capital stock, \$15,000. Incorporators, C. P. Weston, G. F. Burke, H. T. Gathmey.

The California Auto Livery Company, San Francisco, Cal.—Capital stock, \$50,000. Incorporators, W. R. McWood, I. M. Mauley and I. S. Lillick.

The Winters Automobile Company, Scranton, Pa.—Capital stock, \$25,000. Incorporators, A. Adair, R. Winters and J. R. Wilson. They will have the agency for the Apperson car.

The Standard Automobile Company, Wheeling, W. Va.—Capital stock, \$25,000. Incorporators, E. J. Becker, Geo. W. Row, C. E. Morris, Herman L. Abenz and Albert L. Lohm,

The Webb Motor Fire Apparatus Company, St. Louis, Mo.—Capital stock, \$300,000. Incorporators, A. C. Webb, Vincennes, Ind.; D. B. Blossom, Frank R. Tate, John

O. Glanville and H. W. Femmer, of St. Louis.

Hanley Motor Car Company, Kittery, Me.—Capital stock, \$125,000. Incorporators, A. H. Peavey, G. E. Burnham and others.

Fawcett Motor Company, Denver, Col.—Capital stock, \$50,000. Incorporators, John H. Gabriel, W. C. Fawcett and D. G. Packer.

The Chicago Auto Supply House, Chicago, Ill.—Capital stock, \$10,000. Incorporators, J. E. Brennan, Wm. J. Maher and Fred G. Allen.

Motor Car Inn Company, Wabash, Ind.—Capital stock, \$10,500. Incorporators, F. B. Walter, S. C. Cowgill, Burat Blizard and M. C. Honeywell.

The Rogers Motor Car Company, Omaha, Neb.—Capital stock, \$250,000. Incorporators, Ralph Rogers, C. A. Overholt, C. A. Ralston and T. G. Travis.

The Jacksonville Motor Car Co., Jacksonville, Fla.—Capital stock, \$20,000. Incorporators, S. A. Morris, T. J. Mason, C. B. Sloan and W. L. Muser.

The Van Da Grift Auto Car Company, Louisville, Ky.—Capital stock, \$10,000. Incorporators, Lewis J. Perkins, Geo. W. Buck and Wm. J. Van Da Grift.

The Lemly-Wood-Brownlee Auto Company, of San Antonio, Tex., has filed an amendment to its charter changing its name to the Brownlee Auto Company.

The Brosius-Sesline Automobile Company, Fort Wayne, Ind.—Capital stock, \$5,000. Incorporators, Jesse Brosius, W. O. Sesline, Henry Brosius and Andrew Brosius.

#### Trade Personals.

J. D. Donahue has been appointed manager of the Ford Kentucky Auto Company, Louisville, Ky., which has been organized to handle Ford cars in Kentucky and southern Indiana.

HERBERT McDermott, formerly with the Gibson Automobile Company, of Indianapolis, Ind., has resigned to become manager of agencies for the Motor Car Sales Company, Indiana distributors for the Peerless, Regal and Jackson cars.

CLAUDE E. Cox, who was at one time connected with the Overland Automobile Company, and later with the Interstate Automobile Company, of Muncie. Ind., is now engineer of the Wilcox Motor Car Company, Minneapolis, Minn.

NELSON T. GUTELIUS, late automobile editor of the St. Louis Dispatch, and formerly publisher of the Automobile Review, has been appointed advertising manager of the automobile department of the St. Louis Car Company, manufacturers of the Standard Six.

A. P. SLATER has severed his connection with the Aluminum Castings Company as superintendent of the Eclipse Foundry (their Detroit plant), to accept a position with the Willys-Overland Company, of Toledo. The Overland Company intend to make their own aluminum and bronze castings.

# The Horseless Age

First Automobile Journal in the English Language

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### Nut and Bolt Locking Devices.

By E. J. Bartlett.

Like the ideal non-refillable bottle, locking devices for nuts and bolts have always been a favorite problem for inventors. It would be interesting, though tedious, to review all the patents which have been issued for schemes of this nature. Probably few, if any, draughtsmen and designers have resisted the temptation to spend odd moments now and then







FIGS. 1, 2 AND 3.

in sketching out locking constructions, and many become infused with the idea that they have devised a valuable improvement, only to find that it has been covered years before or lacks some requisite of cheapness, simplicity or effective-

The locking devices mentioned below are all those which are in more or less common use in automobile practice and familiar to most readers. That they cover the ground pretty fully will be seen. Some little data is given which may be found useful, as well as suggestions for applying the constructions mentioned.

If an effective lock was the only consideration, forming a head on the end of the bolt would of course be the simplest and cheapest, but the majority of automobile nuts need to be removable without spoiling the bolt. In some few cases, where rivets are not deemed feasible, the end of the bolt may be distorted at a single point by a sharp, pointed tool. The nut may be relocked perhaps a half dozen times without necessitating the renewal of the bolt. Such a construction is permissible to lock the nuts on the bolts securing the bevel driving gear on the differential case, as removal of the gear is not often necessary, many manufacturers even using rivets.

#### JAM NUTS.

One of the oldest forms for securing nuts is the common lock or jam nut shown in Fig. 1. The ordinary proportions are to make the thickness of the heavy nut equal to the diameter of the bolt and the light nut one-half the diameter.

They are locked together by screwing them tightly against each other. When they are also tightened against the piece held in place a greater stress is brought upon the nut nearest the end of the bolt, which, therefore, should be thicker than is necessary for the one next the clamped piece. In practice the thin nut is frequently placed on top, but this is not the correct position. It is probably due to the facts that this arrangement makes a better appearance, and also that ordinary wrenches are not thin enough to turn the thin nut, when it is under, without catching against the top one.

This construction is not so frequently used in automobile practice as the cotter locked castle nut or the spring lock washer. It is not generally regarded as positive as the former, where there is any danger of the nuts working entirely off and falling into moving parts, and it is more bulky, larger and more expensive than the spring lock washer. There are places, however, where it is superior to the others, as it is tightly locked on the bolt and will stand intermittent strains. It is also convenient in some places to use the thin lock nut, as for securing a screw or stud which is adjustable for a ston.

#### SPRING LOCK WASHERS.

There are large varieties of spring lock washers regarded as standard. Like many other parts of the automobile there is very little difference in many of the so called standards which have been developed by similar specifications placed with the manufacturers. The engineers of the Association of Licensed Automobile Manufacturers are now at work selecting types and sections for a real standard which will cover all ordinary requirements. Such a standard, widely adopted, will simplify the lock washer requirements to a reasonable variety.

At the present time washers may be bought from stock varying in size from a No. 6 screw to seven-eighths of an inch in diameter. Each bolt or screw size has from five to twenty different sections of washers, clearly an unnecessary range. There are three general types, the plain, positive and ribbed. The other variations are made by the different sections employed.

The plain washer shown in Fig. 2 depends for its locking quality entirely on the pressure exerted, causing a considerable friction on the threads of the nut and bolt. The nut may be easily removed any number of times without scarring it, and there is little danger of breaking the washer.

The positive type illustrated in Fig. 3 has its ends formed in chisel shaped cutting edges or barbs. The ends are tapered, allowing the cutting edges more freedom to seat in the nut and piece which is clamped, the body of the washer carrying the compression load. This type is very positive, but if the cutting edge imbeds in the nut there is more danger of breaking the washer and mutilating the nut if often removed.

There are modifications of this type which are also widely used, which have the outer corners only turned so as to present a cutting point rather than an edge. As they are a cross between the plain and positive types in construction, so their locking effectiveness is in proportion. This latter type is preferred by many as possessing sufficient locking qualities and allowing the nut to be easily removed. As a matter of fact any of the types mentioned above give very satisfactory results and have the added advantage over the ribbed pattern of holding equally well under the head or nut of a bolt.

The ribbed type of washer shown in Fig. 4 does not seem to be so generally used now as formerly. Aside from the







FIGS. 4, 5 AND 6.

pressure it exerts on the threads its locking feature is the thin upturned rib which wedges in the thread groove on the under side of the nut. This, of course, does not apply when used under a bolt or screw head.

Lock washers are made of a crucible spring steel and well tempered to give them a maximum resistance against pressure. The inner diameter is made onethirty-second of an inch larger than the bolt size for the most common sizes.

Table I gives the sections and pressures of the most common sections of the ordinary bolt sizes. This table is based on washers with a square or rectangular section.

TABLE I.				
Bolt	Washer	Washer	Pressure When	
Size.	Width.	Thickness.	Flat in Pounds.	
3-16	1-16	1-16	150	
3/4	7-64	5-64	350	
5-16	3/8	3-32	500	
3%	5-32	34	650	
7-16	5-32	3/6	600	
3/2	5-32	34	550	
9-16	7-32	1/8	550	
36	7-32	36	500	

SPECIAL LOCK WASHERS.

Occasionally the old fashioned tail washer is employed in special places. A type of this washer is shown in Fig. 5. The washer is punched from soft steel which will bend readily, and the tails are formed at any desired angle with each other. At assembly one tail is turned upward against the flat of the bolt head or nut and the other downward over some flat adjacent surface. It may be used for locking a nut which is not often removed, but more often it is applied to the head of a bolt where the construction does not readily allow a projection to be formed on the piece against which the flat of the head could rest to keep it from turning.

One of the important parts of a car which requires secure locking is the axle nut. Popular locking devices for this part are the D washer shown in Fig. 6 and the tongue washer shown in Fig. 7. Both act in the same manner. The former is secured against rotation by slabbing off one side of the spindle and the



FIGS. 7 AND 8.

latter by milling a narrow slot in it. Either forms a positive lock and prevents any rotative movement from the bearing to be communicated to the axle

Where double nuts are used, as on the axle spindle of the full floating construction, where the nuts cannot be locked by cotter or taper pins, a lip on the outer edge of the D or tongue washer holds the inner nut stationary, and allows the outer nut to serve the function of a jam nut. Such an arrangement is shown in Fig. 8.

#### SLOTTED NUTS.

Aside from the spring lock washer the familiar cotter pin and castle nut are most frequently used. Another well known lock is the taper pin with either the small end solid or, to be more secure. slotted and spread when in place.

Nuts are sometimes made self locking,

at least partially, by slotting and pinching together, as in Fig. 9, or slotting, as in Fig. 10. In the former case increased friction is brought on the thread at one point, as the thread contour is distorted. In the latter case the same result is ob-





Figs. 9 and 10.

tained by the pressure of the nut on the piece. The harder this pressure the more distortion.

One form of patented double lock nut

trequently seen has a portion of the nut proper threaded on the outside tapered surface, and the end slotted. The jam nut screws on the taper, closing in the slots and distorting the threads, the taper thread between the two nuts locking them tightly together.

With the advent of the annular ball bearing the wire locking ring for nuts clamping such bearings on their shafts came into general use. The nuts are usually made round on the outside, with a groove for holding the wire ring. One end of the ring is bent sharply in toward the centre, passing through a drilled hole in the nut and entering the shaft.

### A Home Made Tire Tread.

#### By Theodore M. Prudden.

An armored tire tread is very desirable to a motorist, especially if the roads over which he travels are poor, but this is often an accessory which cannot be afforded. By actual trial and account an armored tire tread can be satisfactorily constructed for less than \$3.

A piece of harness leather, 21/2 inches wider than the width of the tire and about an inch longer than the circumference, should be procured for the foundation of the tread. The circumference is found by multiplying the diameter of the tire, which is marked on every tire, by 3 1-7. The leather should be nearly three-sixteenths of an inch thick, and should be examined for flaws or grub holes. Next procure at a hardware store about 400 belt hooks an inch long. In the middle of the leather mark off a strip as wide as the tire, as shown in Fig. 1, and, beginning at either end, drive the belt hooks into the leather, as shown in Fig. 2, clinching them on the other side. This order of arranging the hooks is chosen because the hooks, which slant, as shown in Fig. 3, not only afford a grip for ordinary work but also afford a side grip to prevent skidding.

Moreover, this arrangement does not weaken the tread, since, if so arranged, the holes caused by the hooks piercing the leather come in line with each other less than in any other order of placing. After the entire tread has been armored in this manner more hooks should be placed in the end which is to lap over, as shown in Fig. 4. Then one-quarter of an inch from the marked off strip punch holes 5 inches apart

and cut the leather away slantingly to the edge, as shown in Fig. 5.

This is to prevent the puckering formed by the tread when it is placed on the tire. Above each hole place a belt hook to prevent any possible ripping of these cuts. Punch two holes between each of these





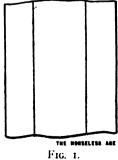
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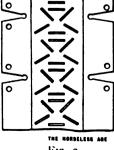
F1G. 4.

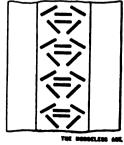
gashes through which to lace the tread to the tire. Now soak the tread in viscol or neatsfoot oil to waterproof it. Buy at some upholsterer's a piece of webbing as wide as the tire and as long as the tread. Catch it with thread in a few places to the middle of the leather and over it paste a strip of heavy paper of the same length and width. The webbing is to prevent the clinched ends of the belt hooks from chafing the tire, and the paper prevents the heat generated by a tire from sticking the rubber in a tire to the webbing.

The tread should be laced around the tire and rim, not around the tire alone, with rawhide or stout cord. It should occasionally be treated with viscol or neatsfoot oil to maintain its waterproof qualities.

The cost of the tread sums up as follows: Leather ..... \$2.00 Belt hooks.... Webbing ..... .15







\$2.90

Fig. 5.

Fig. 2.

### A Continuous Explosion Engine Indicator.

#### By Dr. Charles W. Snyder.

A satisfactory gas engine indicator would be most useful to both the builder and repair man working on internal combustion engines; not a com-

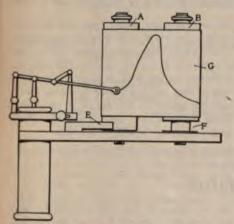
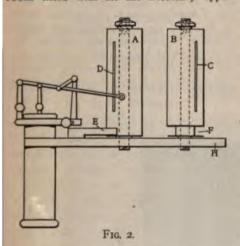


FIG. 1.-CONTINUOUS INDICATOR,

plicated, expensive apparatus which requires the motor to be on the block, and which takes a day or more to apply, but something small and light enough so that it can be attached to the engine in most any position in a minimum of time, cheap enough to be within the reach of the ordinary garage proprietor, and at the same time an instrument giving data which are fairly reliable.

The large manufacturer has his testing room fitted with all the necessary appli-



ances, but the man who does a smaller business and those who are called upon to keep cars in order have nothing whatever to tell them the condition of a motor, except its sound and action on the road. The ordinary steam indicator using a 1/2 inch or 1/4 inch piston and the hundred pound spring will be of some assistance, but it is deficient in several respects. The reciprocating motion of the drum almost prohibits securing a card at any considerable speed. The drum has two dead points where the direction of motion is reversed. The angular velocity of the drum varies

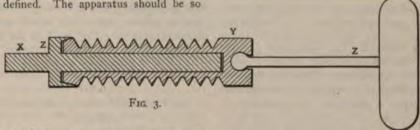
with the position of the crank. The explosion "curve" is a vertical line, as though the expansion was instantaneous, and it is almost impossible to get a single card, usually several being superimposed.

The so-called "inertia effects" in a spring operated mechanism of this kind will, of course, always be found, but my experience leads me to believe that they may be so reduced as to be negligible. I have found that in my own work most of the "waves" usually seen were due not to the vibration of the piston or its spring, but to the pencil arm, which is always light, and to lost motion in the various joints between the pencil and the piston. If these latter were set tight, just tight enough to act as a slight "drag" on the pencil arm, but few waves appeared.

For practical work the gas engine indicator should be able to operate at speeds up to at least 1,000 r. p. m. Each card should be separate, so that the lines are well defined. The apparatus should be so

parts in the ordinary steam indicator, the arm H being of sufficient length so that the two drums A and B may be mounted upon it. These drums are 1½ inches in diameter and revolve freely upon their spindles. They are slotted at C D in the same manner as the small wooden rollers carrying photographic films. A is a plain cylinder but B has a portion F cut out in the manner shown, upon which the operating cord is wound. E is a small spring brake used to produce sufficient tension on the drum A so that there will be no slack in the paper as it is wound from A to B.

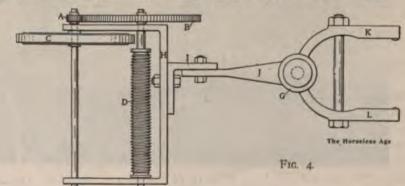
There are two methods of operating this indicator, one directly from the end of the crank shaft and the other from the rim of the flywheel. The former is the most positive, but the latter is much more convenient. We built the spindle X, Fig. 3, with the "squared cone" clutch Z and screwed the short end of the spindle into



constructed that it can be applied to any automobile engine by simply removing the hood, and used on the road if desired; and as it is impossible to get the reciprocating motion of the piston, each revolution of the crank shaft should produce a card of a given length regardless of the speed. These cards will show the efficiency of the engine, whether or not the valve openings are of sufficient size; whether the valves are suitably timed, the work required in expelling the exhaust and drawing in the new charge, the time the spark occurs; whether or not the mixture is properly proportioned, the cylinder compression, and a very close approximation of the mean effi-

These requirements seem to be fulfilled by the double drum indicator shown in the cuts. The piston, spring and linkage are practically the same as their corresponding the end of the crank shaft, then made the hollow worm Y an easy fit over the spindle.

In operation, this indicator is screwed into a plug hole in the cylinder, providing the cylinder is tapped for two plugs; otherwise a special plug may be used having an attachment at the side for the indicator in the same manner as some spark plugs are provided with a "priming cup." The end of the paper-about 5 feet longis inserted in the slot D of the drum A and the remainder of the paper is wound on this drum. The cord is wound on B at F, and the loose end of the paper is "tucked" into the slot C. The cord is then carried over a small pulley placed in a position so that it will wind on the worm Y at the end of the crank shaft, and the cord is made fast to this worm.



The engine is started and the worm is slipped over the spindle and held by the hand from rotating until the time arrives that the card is to be taken. The worm is then pushed suddenly into the clutch and the paper is wound under the pencil from one drum to the other a given distance for each revolution of the crank shaft.

In working out or adjusting an engine, the device shown in Fig. 4 is most convenient. In this appliance the jaws K L are clamped to the frame in any position where the rubber tired wheel C may be brought in contact with the flywheel, motion being secured through the joints F and G. The indicator is placed as in the first instance and the cord is brought through the pulley and attached to the worm

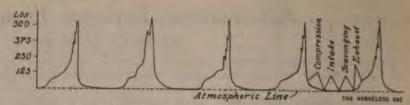


FIG 5.-CARD FROM AN AIR SCAVENGED TWO CYCLE MOTOR,

D, the engine is started and when the card is desired the wheel C is simply pressed against the face of the flywheel, and through the reducing gears A B it turns the worm D and winds the cord upon the worm. This is very convenient in carburetor adjustments and like operations. The apparatus may be applied in a few minutes, two or three "cards" run on the paper,

the driving wheel lifted from the flywheel, observation made of the card, new adjustments made and another card taken, thus getting the result of several different adjustments on one strip of paper. This work may be done at the shop or by a man on the running board as the car is being driven along the road, and the "tuning up" of an engine becomes a simple operation

# New Warner Timing Apparatus.

At the Atlanta Speedway races there was used for the first time a new electric timing apparatus invented by C. H. Warner, of the Warner Instrument Company, of Beloit, Wis., which times accurately to 100th of a second and automatically records the results on a tape similar to that used in an adding machine. The instrument consists of a relay connected with a special ship's clock or chronometer. The recording device consists of a shaft revolving at thirty revolutions a minute or one revolution in two seconds. This shaft is driven by a small electric motor, governed by an electrical governor, to run one-half of I per cent. faster than 30 r. p. m. In order to insure absolute accuracy, a disc clutch, composed of six hardened and lapped steel discs, separated by discs of parchment, is located between the recording wheels and the motor. This allows the shaft to be automatically set to the tick of the chronometer every second.

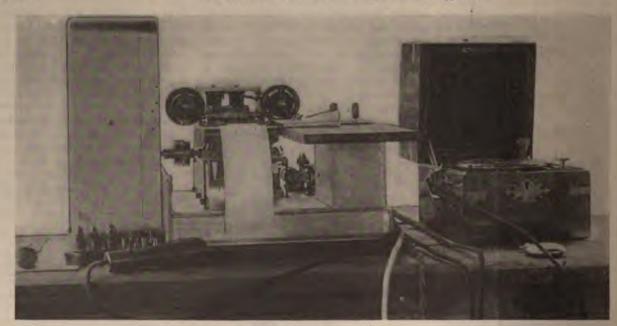
The driven shaft carries four number wheels, the first, or hundredths-of-a-second wheel, being driven by a ratchet from the shaft; the second, or seconds wheel, being held in position by a pawl which is tripped over a second by the first wheel, and a spring mechanism whereby it is indexed forward 1-60th of a revolution or one second. The third, or minute wheel, and the fourth, or hour wheel, work in the same manner. Above the number wheels is a strip of paper 2th inches wide, on which a magnetically operated hammer strikes whenever a car passes the line.

At the start of a race all these wheels are held in the zero position. The first blow of the hammer prints ciphers on the paper, and at the same time locks the hundredths second wheel to the moving shaft, which begins its task of counting. The return move of the hammer shoots the paper forward, showing the time of start recorded. Then, if desired, the time

can be caught at the mile stretch, by simply pressing forward a small switch key, such as used on a telephone switchboard.

The apparatus is operated automatically in the following manner: Across the track, about 3 inches above the ground, is stretched a small wire, one end of which is securely anchored to a post, and the other end attached to a device known as a trap which opens an electric circuit, allowing the circuit to close after the car has passed. The instant the circuit is opened the record is made, and so quickly that the eye cannot follow the movement. This electric circuit is connected in series with a pony relay, a battery, a telephone and a second trap placed at the mile line. Opening this circuit at either the mile or finish operates the relay, which in turn closes a second circuit which operates the recording hammer.

The photo below gives a good idea of the apparatus.



WARNER TIMING AND RECORDING APPARATUS.

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# Revocation of Automobile Patents in Great Britain.

The recent revocation of several of the Renault patents in Great Britain under the new Patent Act making it obligatory upon inventors to work their inventions in that country if they wish to keep them alive brings the import of this act more closely home to automobile engineers and inventors. The Renault system of locating the radiator at the dashboard so as to make the engine perfectly accessible when the bonnet is raised is meeting with considerable favor, and evidently some British manufacturer to whom this arrangement appealed, and who wished to embody it in his cars, in order to forestall any possible infringement action, made application for the revocation of this and the other patents.

Since the United Kingdom is still the best foreign customer of our auto industry it might be concluded that our trade with

that country would likely be injured by the revocation of British automobile patents held by American manufacturers, on the application of rival British manufacturers. Fortunately the success of our manufacturers in the British markets is based not nearly so much on patent protection as on superior factory organization and large scale operation. However, we should think that American inventors would in future be less eager to take out British patents unless the inventions are such that they can be readily sold to established firms, or of sufficient importance to warrant the formation of new companies in Great Britain for their exploitation. There is, of course, some possibility of an agreement being reached between our Government and that of the United Kingdom whereby the "working clause" requirement is waived in the case of American inventors. Such an agreement has just been concluded between this country and Germany, and we understand that negotiations are about to be opened with the British Government in reference to this matter. May they be successful!

# Economizing Alcohol Cooling Solution.

Solutions of alcohol are being used more extensively every year as non-freezing cooling fluids, as, aside from the fact that the alcohol evaporates rather quickly, these solutions are the most all around satisfactory cooling fluids for winter use. The question has naturally come up as to how this rapid evaporation of the alcohol may be prevented. The use of a layer of oil on top of the liquid in the radiator has been suggested, and this expedient would, no doubt, be successful in a stationary plant, but where the surface of the fluid is so much disturbed as in the cooler of a motor car it would be practically impossible to maintain a protective layer of oil on top of it, especially if the return connection to the radiator were near the level of the fluid in the cooler, in which case certainly more of the oil would circulate with the solution than would remain in the top of the radiator.

There is, however, a far more effective way of preventing the loss of alcohol which is applicable to all cars operated under such conditions that the cooling fluid does not reach a temperature above the boiling point, which applies to practically all cars during the winter months. It consists of completely closing the cooling system so

that there is no chance for the alcohol vapors to escape. The overflow pipe should be hermetically closed, as well as any vent there may be in the filling cap or elsewhere. To prevent injury to the radiator from steam pressure a small spring check valve should be secured to the filling cap or the overflow pipe so that when a pressure of one or two pounds per square inch is reached in the cooling system the steam will escape and relieve the pressure.

The advantages of this arrangement are not limited to the economy in the use of alcohol which it effects; it also should insure much greater constancy of the density of the solution, and hence of the freezing point, and would consequently relieve the operator of worry or of the duty of making constant hydrometer tests.

# "No Inherent Right to the Use of the Highway."

One more attempt to overthrow the State licensing system failed last week, when Justice Alfred Reed, of the New Jersey Supreme Court, rendered a decision in the test case brought by the White Company, holding that the law is valid in all points. The campaign planned before the case was inaugurated miscarried at the very beginning, owing to a mistake in the procedure. It may be recalled that a representative of the White Company, accompanied by a lawyer, went on a trip in one of the company's cars loaded with advertising literature from the headquarters in New York to the company's branch in Philadelphia, and the car was therefore evidently engaged in interstate commerce. Not being provided with a New Jersey State license, the driver of the car was arrested at Trenton and haled before a judge. In order to save him all inconvenience his legal counsel at once arranged for his release on bail and simultaneously applied for a writ of habeas corpus to the United States Court, overlooking the fact that there was no occasion for habeas corpus proceedings, since his client never was incarcerated. The United States Court promptly rejected the application, and the case once started had to be fought out in the State courts.

The grounds on which the constitutionality of the Frelinghuysen act was contested were, briefly, that the license fee, in so far as it exceeds the amount necessary to defray the legitimate expenses of the licensing bureau, is a tax which in connection with the personal property tax con-

stitutes double taxation; that the tax is illegally based on the rated horse power of the car instead of on its actual value, and that the State has no right to interfere with vehicles engaged in interstate commerce. All of these points were negated by Justice Reed.

There is one most remarkable passage in Justice Reed's opinion, in which he holds that there is no inherent right in any one to use the road for automobile traveling, and that the license is a privilege under restrictions. This is undoubtedly contrary to the views most motorists have held up to this time, and seems to be contrary to the other earlier court rulings, to the effect that automobiles have the same rights on the public roads as horse vehicles. We had always supposed that the public roads were for the free use of the public; that the public had an inherent right to their use in traveling about on foot or in horse vehicles. However, for New Jersey, at least, this matter seems to have been finally settled in the contrary way.

The attempts to upset the State licensing system through the courts have so far been very unsuccessful, and for the future it will probably be the best plan to seek relief from the requirement of registration of non-residents at least through the State legislatures. While opinion among motorists is divided as to the justice of taxing them for road construction purposed in their home States, there is practical unanimity regarding the injustice of taxing non-residents who may want to tour in a State for a few days, and this view has gained so much ground in recent years that now nearly all States allow non-resident motorists to use their roads for a limited time without becoming regis-This exemption of non-residents should become universal. Whether there is chance of successfully attacking the tax on resident motorists appears to be extremely doubtful after this latest decision.

#### Some Developments Due to Racing.

There is no doubt that certain improvements in construction and developments in the line of accessories and equipment during the past decade have been due to the rules made by those governing the sport to keep either weight, horse power or outside help in races within reasonable bounds. It was rather amusing in the earlier races to see a car enter a control or supply station, and perhaps as many as a score of men jump to different parts of the machine to

replenish water, oil or gasoline, or to clean or adjust various parts and perhaps to replace tires. As car speeds increased the tires could not well withstand the strain of the long races, and tire controls became more and more frequent until a race became largely a matter of the number and celerity of the control attendants rather than the intrinsic merits of a car. To put an end to this abuse a rule was adopted in France for 1006 which forbade anyone but the driver and his mechanic doing any work on the car other than the possible replenishment of supplies. The designers at once saw that this rule would have the most important effect in connection with tire changes, and they naturally set about for some means of reducing this labor as much as possible. This effort resulted in the invention of the demountable rim. The results of the races of 1906 clearly showed the benefits of this device to the industry, and it became universal on all racing cars

The rule of 1906 and the demountable rim also brought on another improvement. Formerly it had been the custom in case of tire trouble to run into the nearest control on the rim. As under the new rule no outside help could be obtained at the control it soon became the custom to carry the extra tires and rims on the cars, and to make the changes on the spot. It did not take long to discover that if the tools and tires were readily accessible, considerable time could be saved on the change. Hence considerable ingenuity was used in the method of carrying the tires, as well as in the position and method of carrying the tools. The jack was placed convenient to the mechanic so that he could get hold of it before the car came to a standstill, and the bit used for the removal of the rim was placed handy to the driver. However, it is probable that the greatest ingenuity has been exercised in the method of carrying the spare tires.

On the other hand little has been done in this direction on pleasure cars which have been equipped with demountable rims. In fact, it is probable that the removal of the spare and the replacement of the damaged tire in the tire carrying device of the average pleasure car equipped with this type of rim takes more time than all the other operations put together. In many cases the irons and straps used for carrying spare casings are used without any change. These were well enough when it was the exception rather than the rule to change a shoe on

the road when tire trouble occurred. Many of these devices use three or more inaccessibly placed straps, and require one person to hold the tires in place while another secures them by the straps.

An examination of various cars in two recent road races showed quite an interesting variety of ways of carrying spare tires so that they might be instantly accessible in case of need. In one case, at least, no strap or other fastening was used to secure the tires in their place, the rack being a sort of skeleton basket. In another instance a spring actuated bolt or locking bar was used. In most instances a single trap and buckle were very accessibly located. In fact the method of carrying tires seemed to reflect the individuality of the drivers, as they often differed widely on the same make of car. Many of these devices may appear unsightly to some persons, but in cases of this sort one should bear in mind the old saving, "handsome is that handsome does."

It is to be hoped that those manufacturers who equip their cars with demountable rims for 1910, either regularly or as an option, will give more attention to the method of carrying the same than has been given the problem heretofore.

#### Coming Events.

November 25—Edgewater-Fort Lee (N. J.) Hill Climb.

November 25—Redlands, Cal., Hill Climb, Mile Hill Climb Association.

December-Worcester, Mass., Three Day Endurance Contest, Worcester A. C.

December 12—San Antonio, Tex., Annual Endurance Contest, San Antonio A. C.

December 25 to January 1—Columbus, Ohio, Automobile Show, Auditorium, Columbus A. C.

December 29-30—Philadelphia (Pa.) Annual Midwinter Endurance Contest, Quaker City M. C. December 31 to January 7—New York City Annual Show, Grand Central Palace, American Motor Car Manufacturers' Association.

January 8-15—New York Annual Show, Madison Square Garden, Association of Licensed Automobile Manufacturers.

January 10-16-Portland, Ore., Annual Automobile Show,

January 15-29—Philadelphia, Pa., Automobile Show, Second Regiment Armory.

January 24-29—Detroit, Mich., Automobile Show. Wavne Hotel Gardens.

February 4-6—New Orleans, La., Annual Marii Gras Speed Carnival. New Orleans A. C. February 5-12—The Ninth Annual National

February 5-12—The Ninth Annual National Show at Chicago, Ill., National Association of Automobile Manufacturers.

February 14-19—Buffalo, N. Y., Automobile Show, Broadway Arsenal, A. C. of Buffalo, February 14-21—St. Louis, Mo., Annual Annual

mobile Show, National Guard Armory.

February 19-26—Newark, N. J., Automobile Show, Essex Troop Armory.

Show, Essex Troop Armory.
February 19-26—Salt Lake City, Utah, Automobile Show, Auditorium.

February 21-26—Binghamton, N. Y., Automobile Show. State Armory.

February 26 to March 5—Kansas City, Mo. Fourth Annual Show, Convention Hall, Kansas City Automobile Dealers' Association.

# Novelties in Car Design and Accessories Seen at the Atlanta Show.

By H. H. Brown.

There is one fact which is so evident to those who attend the larger automobile shows with anything like regularity as to be almost unnecessary to mention it, and that is the tendency of the older makers to stick to what may be called standard construction, and to avoid anything in design which may be said to have the taint of freakishness about it. There is also a tendency, which grows stronger and stronger every year with these same established makers, to stick to the general lines which have made them successful, and not to alter their models except in the smaller details and what may be strictly called refinements. However, now and then we come to some exception to this rule.

#### VALUE OPERATION

One firm, the Dayton Motor Car Company, for instance, who have for a number of years been successful with an overhead valve motion employing a single rocker arm actuated by a single rod which operates both inlet and exhaust valves, have this year abandoned this form of valve motion, although in the past it was, from a purely mechanical standpoint, all that could be desired. This change was made because they believed. after trial, which was satisfactory to themselves, that better results could be obtained from their motor if the inlet valve were opened slightly before the closing of the exhaust. Of course with the single rocker arm this was impossible, hence the change. In place of the single rocker arm two are employed, each worked by a separate cam shaft on opposite sides of the motor. The valves are placed on the same diametrical line of the cylinder, and are not offset; in fact, except for the lugs which support the pivot bearings of the rocker arms, the cylin-

ders remain precisely the same as with the old form of valve motion.

#### DEMOUNTABLE POWER PLANT.

The introduction of the automobile for commercial purposes has led to various modifications to reduce the cost of repairs and the time taken to effect them. A rather interesting example of an effort in this direction is a form of construction used on the Sultan taxicab. In this machine the motor and its auxiliaries, including the radiator, as well as the clutch, transmission and dash, are mounted on a sub-frame in such a manner that they can be removed bodily from a cab and an entirely new power unit substituted for it inside of thirty minutes. It will be readily seen that this reduces the amount of capital necessary to invest in order to keep a certain number of cabs running. Also, the amount of necessary garage space is greatly reduced, and, owing to the much greater accessibility of the parts when the power unit is removed from the cab, repairs can in many cases be accomplished with much greater ease and celerity.

#### CARBURETOR NOVELTIES.

The carburetor question seems to be as yet an unsolved problem to quite a number of the makers. Many still stick to the type which employs a fixed size of jet while running, and attempt to keep the mixture constant by means of some sort of a suction operated air valve. There seems, however, to be a decided tendency toward that type of carburetor in which it is attempted to solve the problem by altering the jet area as well as the air opening in order to maintain the mixture constant. The Stevens-Duryea Company have this year introduced a new model in which this form of regulation is used, the suction operated air valve opening the needle valve wider and wider as the auxiliary air valve is opened, the spring being so proportioned as to give almost a constant tension throughout its range of action. The Stoddard-Dayton firm this year employ a carburetor that has two jets, one with a constant opening and the other controlled by a needle valve, which is opened by the action of the auxiliary air valve. Wheeler & Schebler, one of the best known firms making carburetors for the trade and individuals, have this year introduced a carburetor designed to work along these lines. However, in this case the needle valve is controlled by the action of the throttle.

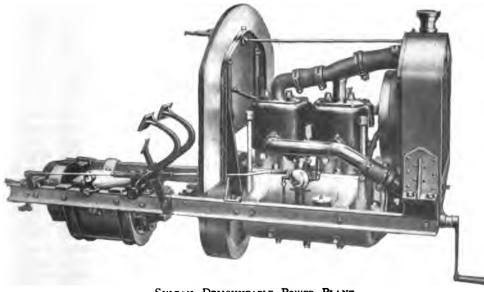
#### PREVALENCE OF MAGNETO IGNITION.

While carburetion practice is by no means near standardization, the matter of ignition seems to be in a fair way toward that end. Magneto ignition is all but now universal; in fact, the lowest priced car in the show was equipped with a magneto. However, there is a great tendency on the larger cars to provide another complete ignition system, using coils and batteries for a standby. This is also very useful in detecting faults in the magneto system, as well as for starting up either on the switch or by the crank when cold. In this case there seems to be no decided tendency one way or the other, either toward the single coil and distributor or toward the four or six unit coil. There does, however, seem to be a decided tendency toward the use of the master vibrator of some form or other, either of the unispark or the regular magneto type. In fact, almost the only exception to the universal use of the magneto was furnished by the manufacturer of a car equipped with a two cycle motor, who employs a well known unispark system which is inoperative when the machine is turned over backward. This is a very desirable feature with most two cycle engines, which run with equal facility in either direction.

#### THE MASTER VIBRATOR.

An interesting new construction is used this year by the Connecticut Telephone and Electric Company, who have for the first time shown a master vibrator at this show.

A rather novel feature is the use of a double master vibrator. The unit on which this is mounted has a vibrator at either end. Simply placing the unit in the coil box connects up the upper vibrator so that it will operate. In case of the vibrator in action getting out of adjustment it is only necessary to remove the unit, turn it over and replace it, and the other vibrator blade will be brought into action. A minor feature of this coil is the use of hard rubber cylindrical coil cases, with metallic bands sur-



SULTAN DEMOUNTABLE POWER PLANT.

rounding them, which serve to complete the contacts with the springs in the coil box. A button is placed on top of each of these units for the purpose of breaking the primary circuit to that coil, and thereby cutting out the ignition to any particular cylinder. This new form of unit is also made in the regular vibrator type as well.

#### NOVEL MAGNETO.

A rather interesting form of magneto which is used to spark a four cylinder coil without a distributor, known as the "S X," is shown by the Lutz-Lockwood Company, of Aldene, N. J. With this magneto two



TYPE "S X" MAGNETO.

separate transformer coils are employed with spark plugs in series, one coil sparking cylinders 1 and 4 and the others cylinders 2 and 3. Two contact breakers, spaced 180 degrees apart, are employed. The current is led to the live points of both circuit breakers by means of collector rings and brushes.

The circuit breaker levers ground their respective terminals to the frame of the magneto; therefore, ordinarily the magneto is working under a short circuit. The live ends of the circuit breakers are connected to one pole of the primary of one of the coils, and a common wire leads the current back to the frame of the magneto from the coil box. Now, when the current is interrupted by the breaker cam striking either of the circuit breaker levers, the current will flow to the particular coil which that particular circuit breaker operates, thus inducing a current in the secondary, the return, of course, being by the ground wire which is common to both coils.

A rather interesting development in con-



COIL USED WITH "S X" MAGNETO.

nection with battery ignition on motorcycles is the use of a specially wound coil which will operate on two dry cells. The object of this is to save weight and space on the machine. It is said that these coils give remarkably good results in battery economy.

#### PRACTICE IN LUBRICATION.

In the line of car lubrication there is a decided tendency toward simplicity and the use of splash systems and circulating systems in which the coil is led through large ducts to the various parts, the excess oil falling into a sump to be again circulated as needed. This system has been successfully used on the Chalmers-Detroit and also on the Marmon cars. On motorcycles splash systems, pure and simple, are employed, and these have been so thoroughly worked out and perfected that probably no change is desirable. However, this year has brought forth a marked change among almost all of the American makers in the method of feeding the oil. Formerly, this was done intermittently at stated periods by a small hand pump or measure. This year most of the makers have adopted some constantly operating measuring or pumping device. The Indian and Merkel employ a small plunger pump, with adjustable stroke, this making about one stroke to thirty revolutions of the motor. The Thor Type IV, however, employs a small revolving measuring device.

#### TIRES AND RIMS.

In the line of tires nothing of a very radical nature was shown. There were none of the solid rubber tires designed to replace the regular pneumatic in its proper field, although there were a number of solid tires shown designed to be used for heavy commercial machines. There is one tendency which seems to be growing more marked every year, and that is the tendency for every tire maker to adopt some form of all rubber non-skid tire. The projections on these are of various shapes and variously arranged. The latest shapes seen are Maltese crosses. A rather interesting example of this type was a motorcycle racing tire. This tire was designed for racing on board tracks which are insufficiently banked for the speed the machine is capable of making.

A non-skid, as is well known, will to a certain extent slow any machine. To overcome this difficulty this tire is made with three ordinary circumferential corrugations at the centre of the tread, which when the machine is running straight ahead are alone in contact with the ground, but on rounding a curve when the machine lays over there are two rows of cylindrical projections on either side, which then perform their non-skidding functions.

#### NOVELTIES.

Probably the majority of the cars exhibited were fitted with quick detachable rims. Comparatively few are equipped with clinchers, and there seemed to be an increasing tendency toward the use of demountable rims. The new Marsh rim has been considerably altered from the last year's pattern. In the first place, only one ring is used, the ring which was formerly placed next the tire having been dispensed with, the locking ring now performing the functions of both. The ends of this ring have hooks which fit into an open slot in the side of the rim and face toward each other. This virtually forms a T shaped slot into which a T shaped bolt of ample dimensions is fitted. A box shaped piece, known as the cap, fits over

the hooks. The outer sides of these are somewhat tapering in a direction radial to the wheel, and the sides of the cap are flared to fit this taper. The result is that when it is put in place and the nut screwed up against the lock washer there is a powerful contracting action on the ends of the ring and it is securely locked in place. It is practically impossible for this rim to rust in place so that it cannot be removed with ease.

Quite a number of demountable rims were shown, most of these having been on the market for some time. Among these was the Firestone. This is practically unchanged as far as the rim itself goes, but a rather neat idea was shown in connection with it which greatly facilitates the change. Instead of using the ordinary nut which is affixed to the valve stem after the rim is in place on the wheel, a sleeve is placed around the valve stem against which the valve cap is screwed. This permits the tire to be removed or replaced with-



WOODWORTH TIRE CHAIN.

out the necessity of screwing and unscrewing the valve cap and washer each time that a change is made. The valve hole, of course, is enlarged to allow the passage of the cap. The new Empire rim was exhibited for the first time at this show. This rim was described in a recent issue of this paper.

Rather a novelty in the way of a nonskid chain is the Woodworth self tightening chain. A unique feature of this chain is the use of leather pads underneath the chains which protect the tire tread from undue wear. The self tightening feature of this chain consists in the use of a "cinch" strap on either side, the two ends being connected by a strap which is given a turn around one of the spokes, the whole being drawn up reasonably taut. When any looseness occurs the chain will, of course, tend to creep. The strap is passed around a spoke forward of the "cinches," so that the creeping tends to tighten up the "cinch."

A little device known as the universal anchoring device for securing "blow-out" sleeves in place is rather interesting. This consists of a small casing which contains a couple of reels on which are wound straps. Small ratchets are fitted to the reels, and the ends of the straps have hooks to secure them to the tire



UNIVERSAL ANCHORING DEVICE.

sleeve, which has suitable arrangements for this purpose. A U shaped piece is fitted to the device to secure it in the proper position on the felloe of the wheel. Two of these are used to a tire sleeve. A strap is also fitted to the sleeve which is used to prevent creeping.

#### SEAT STARTERS.

Self starting or seat starting devices do not seem to make much headway. Two cars were seen equipped with devices of this sort, in which compressed air is used to turn the engine over until it has picked up its cycle. There is one advantage about devices of this type, and that is that the method of getting up the pressure, whatever it may be, is capable also of use for power tire inflating. The desirability of such a device is apparent to almost any experienced motorist. The Pierce car had a small pump fitted simply for this purpose. It is of the two cylinder opposed single acting type, the two pistons being integral and a single connecting rod being used. The dimensions are about 1x2 inches. The pump is secured to the chassis frame on the left side. It is driven by a sliding gear which is placed on the circulating pump shaft. This gear slides on a feather and has a ball catch which holds it in or out of engagement with the pump gear. To put the pump in action the gear is put in position by hand with the motor at rest, no lever or other shipping mechanism being employed. There is a reduction of about one to two to the

Returning, however, to the matter of self starting devices—a spring actuated device of this sort was on exhibition in one of the tent shows, and it certainly worked all right on the car to which it was fitted, a small Ford runabout. A pedal operated device was also in evidence at the show which was very well worked out. A safety device is fitted to

this which automatically throws the dog catch out of gear as soon as the flywheel commences to move backward. The mechanism is quite ingenious and is worthy of a more extended description

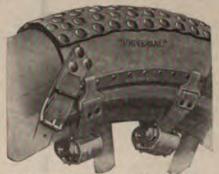
#### SIGNALING DEVICES.

Probably there is no accessory on which more ingenuity has been lavished than on signaling devices. The Gabriel Horn Company are regularly marketing this year a four note keyed horn on which bugle calls can be played. Besides this they also have a ten note horn on which most of the simple melodies can be performed with more or less artistic effect, depending on the musical ability of the driver.

Probably there is no motorist of any experience who has not got caught out after dark with some trouble where a light in the right place would have been a great boon. The Standard Auto Supply Company, of Chicago, showed a device of this sort which will appeal to those who have met with trouble at night. It consists of a small incandescent lamp mounted in a reflector with a band attached to it by means of which it can be secured to the forehead, thus leaving both hands free to work and at the same time throwing the light in the direction in which the wearer of the device is looking.

#### SPEED INDICATORS.

Perhaps one of the greatest novelties in the show was the Shipman speed indicator, made by the Shipman Instrument Company, of Sudbury, Pa. In the first place, the principle of operation of this device is one which heretofore has not been applied to automobile speedometers, although it has been used very successfully for obtaining the velocity of the wind in connection with anemometers. The principle referred to consists in timing motion through a fixed distance. The

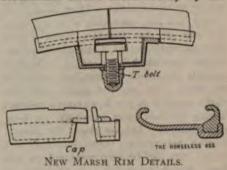


· Universal Emergency Tire Sleeve.

instrument, in addition to giving the speed at any given time in miles per hour, also keeps track of the actual running time of the machine. It is made in various models, and one of these is arranged with two hands, one a long one indicating the speed in miles per hour, the other a shorter one on the same shaft being a trip running time dial indicating the number of hours the machine is run-

ning. Above this is a counter which indicates in figures the number of running hours in a season. To the left are placed a trip and season odometer. It will be seen that the average rate of speed can be easily calculated at any time from the two trip records. This feature is especially useful on commercial cars, particularly of the heavier type, when it is desired to make sure that the driver does not habitually exceed a given rate of speed.

This device has its time recording mechanism wound automatically by the



motion of the driving mechanism of the odometer. One specially good feature of the device from the mechanical standpoint is the fact that all parts are comparatively slow moving.

#### The Canadian Show.

The Canadian Automobile Show will be held in the St. Lawrence Arena, Toronto, under the auspices of the Ontario Motor League, from February 24 to March 3, 1910. E. M. Wilcox, secretary of the league, will be manager. He believes that the show will be the largest of its kind ever held in Canada, as there is an unprecedented increase in the sale of automobiles in Canada at present, and the number of automobile and accessories firms in business in Canada is double that of last year. The Ontario Motor League, which is the association of automobile owners for the Province of Ontario, is taking an active interest in promoting the show. It proposes to have the annual convention of members and others interested in goods roads during the week of the show. consisting probably of a three days' session and a banquet. Leading authorities on good roads from the United States will be invited to attend and address the convention. The St. Lawrence Arena, in which the show will be held, is a large building owned by the city. An elaborate plan of decoration will be carried out, and every effort made to make the show of national character.

#### Pittsburg Show.

The Pittsburg Automobile Dealers' Association at a meeting held on November 11 decided to hold its annual show in the Duquesne Garden in April, immediately after the closing of the ice skating season there. The following show committee was appointed: Frank Saupt, chairman; Geo. P. Moore, Mr. Newell, W. M. Murray. The association now comprises twenty members.

### GARAGE AND SALESROOM.

# The Sea Gate Garage, Sea Gate,

Situated on the outskirts of Sea Gate, a private residence park at the extreme southern end of Coney Island, N. Y., this garage enjoys unique opportunities for securing business during the summer season. The main building is located just within the private grounds, about a block from Surf avenue, and the repair shop is on the opposite side of the boundary street (West Thirty-seventh street). The main building is one story in height and of reinforced concrete construction throughout, including the roof. It is 100 feet square, with the roof supported on one large central column, leaving the floor space unusually free from encumbrances. The cut shows the general interior appearance. One hundred and twelve cars can be accommodated on this floor, though seventy-five is as many as have yet been stored in the building at any one time. As will be seen from the floor plan, the window lighting is liberal, and is augmented by a skylight 12 feet square in the centre of the roof. Four flaming electric arc lights furnish ample illumination at night. There are two entrances, one on West Thirty-seventh street and one within the park. No provision is made for heating either of the buildings, for the business season lasts only from May I to October 1. Both buildings are fireproof, and no fire

extinguishing apparatus other than a few hand extinguishers and sand in barrels is

The supply room and office, 16x20 feet in

kinds. On sales here, as well as on gasoline, oil and all repairs, the triplicate check system is in use. The room is furnished with three large show cases, and all the

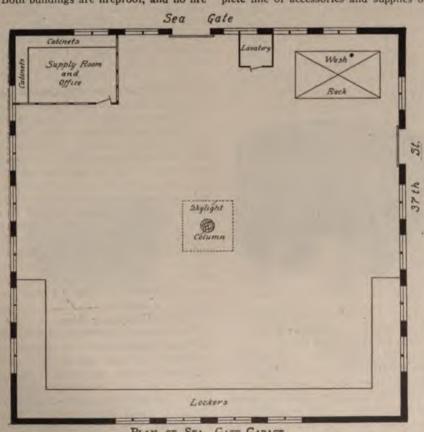


INTERIOR OF THE SEA GATE GARAGE.

dimensions, is located in one corner of the building, and is stocked with a very complete line of accessories and supplies of all

available wall space is used for cabinets and drawers. Gasoline is stored below ground, 30 feet from the building, in a 315 gallon Bowser tank, from which it is pumped as needed. Seven grades of lubricating oil are carried in stock, the oil sold by measure being stored in 60 gallon portable cans. One wash rack, fitted with overhead water connections, is located in a corner of the room. Large, roomy sted lockers for the use of patrons are arranged nearly half way around the building, and a lavatory, about 8 feet square, is located conveniently near both entrances.

All repair work is carried on in the smaller building, which is a one story structure, 40x100 feet. The machine shop occupies a space 20x25 feet in one corner of this, and is equipped with two lathes, a planer, a milling machine for cutting gears, a large and a small drill press and a grinder. A 5 horse power electric motor furnishes the power to operate these tools, and also drives the air compressor. The latter is so arranged as to automatically keep up a pressure of 110 pounds in a 10% cubic foot storage tank. From this tank a pipe line 550 feet in length conveys the air to the main building, where it is distributed to various wall connections. Here also is located a General Electric rectifier for transforming the alternating current supplied from the mains into direct current for charging storage batteries. The charging outfit is capable of charging the batteries



PLAN OF SEA GATE GARAGE

of four ordinary electrics at one time. Benches are liberally provided. The equipment of the shop also includes a complete brazing outfit and a vulcanizer for tire repairs. The floor space will comfortably accommodate about eight cars on repair, and there is one concrete pit.

Comparatively little renting business has been done in the past, but for the next season this garage will be a branch headquarters for the W. C. P. Taxicab Company, with main headquarters at Broadway and Fifty-sixth street, New York city. Twentyfive taxicabs are to be stationed here, and a flat rate of \$6 will be charged for the trip from that section to any part of the Borough of Manhattan. The local agency for the Stearns cars is also to be placed with the proprietors of this garage, but no display stock will be carried.

While in the past a considerable amount of transient business has been done in addition to that regularly obtained from the local summer residents, it is quite probable that there will be an increase in transient trade with the opening of two new streets terminating at Sea Gate, one leading to Coney Island and the other along the Bay Shore to Bath Beach and thence to Brooklyn. Both of these streets are to be made excellent automobile roads, and will undoubtedly attract many motorists. Practically all the automobilists going to "the island" now travel over the roads entering at a considerable distance to the north of Sea Gate, but with the opening of a route along lower New York Bay it is to be expected that a great deal of the auto traffic will be diverted in that direction, and this garage will then be on a direct highway from Coney Island to Brooklyn and New York.

Motor Mart for Columbus, Ohio. Columbus, Ohio.—The Charles Schiear Motor Car Company, which has a Columbus branch managed by C. Roy Clough, has closed a lease for a salesroom at the corner of Fourth and Spring streets. The new building will be ready for occupancy about December 15. The company will handle the Hupmobile and the Velie. The Franklin Motor Car Company will take a portion of the same building for salesrooms for the Franklin and the Reo. The Speedwell Company, of Dayton, have taken a lease on the south room of the same building for a Columbus agency for the Speedwell. The building is being constructed by Caleb L. McKee.

#### San Diego Dealers Form Association.

The San Diego Automobile Dealers' Association has been organized at San Diego, Cal., with J. W. Swan as president; F. B. Nailor, vice president; Wilson Smith, secretary, and Warner M. Bateman as treasurer. The association starts with a membership of sixteen, including practically every dealer in the city, as well as several

garage owners who do not handle cars. The objects of the association are to prevent price cutting, to work together for the improvement of roads and to boost the fair planned for 1915.

#### Fenestra Metallic Sashes.

We show herewith a photograph of a . Fenestra steel sash window, the construction of which was described in our last week's issue. This sash, which is particularly adapted for garages, etc., offers the advantage that it forms a steel grating and gives protection from thieves.

#### Garage Notes.

BAINBRIDGE, GA.—The Caldwell Automobile Company are now occupying their new garage.

SCRANTON, PA.—The Anthracite Motor Car Company will occupy a garage at 625 Lackawanna avenue.

PITTSBURG, PA.—D. A. Dyche is preparing plans for the erection of a \$50,000 garage at Center and Craig streets.

PEORIA, ILL.—The Country Club is endeavoring to secure a site for a garage to house the cars of its members.

CHESTERTOWN, DEL.-J. H. Sides has purchased the Armstrong Hotel property, which he will convert into a garage.

KANSAS CITY, Mo.—S. E. Montgall has secured a permit to build a garage at 1011 East Fifteenth street, to cost \$16,000.

FALMOUTH HEIGHTS., MASS .- J. F. Randall has purchased a lot at No. 117 Grand avenue and will build a garage on it.

PHILADELPHIA, PA.—A. C. Trammell, of the local Vesta Battery agency, has joined G. Hilton Gantert in conducting the Stearns agency.

LAKEFIELD, MINN.-N. W. Weis has gone to Osage, Ia., to engage in the automobile repair and general machinery business in that town.

MILWAUKER, WIS .- Dr. Fred Heinemann has let a contract for the building of a 40x70 foot solid brick garage at Juneau, and Market streets.

PHILADELPHIA, PA.—Solomon Greenberg has bought the southeast corner of Broad and Dauphin streets, upon which he will erect a four story fireproof garage.

MINNEAPOLIS, MINN.—The garage of Dr. C. D. Whipple, 2737 Chicago avenue, was destroyed by fire. A \$3,500 automobile and a stock of supplies were also consumed.

DENVER, COL.-Milo A. Smith has plans for a \$6,000 garage to be built at Colfax and Josephine streets, facing the City Park esplanade. Work will begin immediately.

NEW YORK CITY, N. Y .- W. & J. Sloane, the large carpet house, have bought a plot of land, 541-547 West Twenty-ninth street, upon which they will build a garage and stable combined.

DETROIT, MICH.-The Great Western Automobile Company, of Peru, Ind., have established a sales branch at 878 Woodward avenue, under the corporation name of the Great Western Automobile Company of Detroit. The new branch opened for business on the 15th.

WICHITA, KAN.—E. W. Ames Motor Car Company, corner of Water street and West Douglas avenue, will soon move to their new white stone and concrete garage on North Main street.

Louisville, Ky.—The Banks Motor Company, agents for the Ford car, are located in temporary quarters at King's garage, on Second and Guthrie streets, until their new quarters are finished.

SCHENECTADY, N. Y.—B. A. Burtiss has arranged for a course of instruction for automobile owners and drivers at his garage in Barrett street. Lectures will be given three nights a week, beginning Novem-

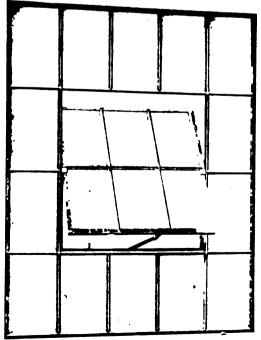
PHILADELPHIA, PA.—The Motor Supplies Company, agents for the new Empire "20." have secured permanent quarters at 608-10 North Broad street. The building has been remodelled to meet the requirements of its new occupants.

PORTLAND, ORE.—Howard M. Covey, of the Covey Motor Car Company, has purchased the one-third interest of Dr. E. G. Watts in the company for \$25,000. Mr. Covey is now the sole owner of the busi-

NEWARK, N. J.-James S. Holmes will erect a garage in the rear of his residence on Park avenue and Day street. It will have twelve apartments, which he will rent to automobile owners in the neighborhood.

SEATTLE, WASH.—The Buick agency is to be managed this season by Louis Cohen. who has secured temporary quarters at the Eureka Garage on Broadway. Before the season is well advanced, however, the agency expects to have a well equipped garage of its own.

VINCENNES, IND .- The Johnson Auto Company, whose garage is on South Second street, in the old skating rink, have in-



FENESTRA WINDOW SASH.

augurated an automobile service to and from Union Station on a popular rate basis. A night service will be maintained for the accommodation of theatre parties, dances and trains.

ROCKVILLE, IND.—The Rockville Automobile and Harness Company's building in the Harrison block was destroyed by fire last week. There was only \$4,500 insurance on the building.

METUCHEN, N. J.—A garage is to be opened by the Metuchen Automobile and Garage Company, of which John C. Bowers is manager. The building is of concrete and will be ready for occupancy November 25.

DENVER, COL.—Harold Brinker has retired from the Brinker-Vreeland Company and joined the Johnson-Fletcher Company. B. F. Vreeland will continue the business of the first mentioned firm, which handles the Moon and Matheson, and the Rauch & Lang electric.

Los Angeles, Cal.—The Angeles Motor Car Company has been organized here with L. L. Brentner, formerly manager of the Standard Motor Car Company, president; S. M. Dutcher, treasurer, and C. W. Mc-Cabe, secretary, to handle the Coast agency for the Rider-Lewis car.

INDIANAPOLIS, IND.—The Shoemaker-Smith Automobile Company is being organized for the purpose of conducting an agency for the Parry cars. A lease on quarters in the new Pennway Building has been arranged and the company will begin business about December 1.

COLUMBUS, O.—The McDonald Automobile and Livery Company, with a capital stock of \$50,000, was incorporated recently to establish a garage and sales agency at 1082 North High street. M. J. McDonald has been elected president; J. A. Taft, secretary, and Fred T. Jones, treasurer.

SEATTLE, WASH.—The F. A. Bardshar Automobile Company has been formed to handle the Stevens-Duryea car in Seattle and western Washington, and will soon erect a garage. The company is composed of F. A. Bardshar, formerly Stevens-Duryea agent in California, and Thomas G. Young, formerly with the Olympic Car Company, of Seattle.

TOLEDO, OHIO.—Alfred W. Norris, formerly manager of the Norris Auto Company, of Saginaw, Mich., and more recently Buick branch manager in Toledo, has organized the Norris-Toledo Motor Sales Company, of which he is treasurer and manager. The company will handle the Demot, Parry and Velie cars. A salesroom has been opened at 623-625 Madison avenue.

Boston, Mass.—The Overland Motor Company of Boston has been organized here to take over the Overland business in this city from the Linscott Motor Company, who have been handling the Reo and Overland. The new company will have temporary headquarters at 124 Columbus avenue until the new salesroom at 161 Columbus avenue, now occupied by the B. F.

Goodrich Company, is fitted up. Chas. G. Andrews, who has long been associated with the Linscott Company, will be manager of the Overland Company.

FORT SCOTT, KAN.—Kearns & Glunz, who recently secured the Mitchell agency, will erect a 50x120 feet concrete garage and salesroom in a central location.

PATCHOGUE, N. Y.—W. F. Morell & Son have torn down the north part of their building on Peconic avenue, and will build a two story garage in its place.

· SALEM, ORE.—The Cherry City Auto Company, recently organized, have secured the building to be vacated by the Portland Railway Light and Power Company for a garage. They are agents for the Rambler.

POUGHKEEPSIE, N. Y.—Charles H. C. Tiffany, of the Tiffany Machine Company. has purchased a plot of land on Market street opposite the Adriance Memorial Library, on which he will erect a garage and machine shop.

ASHEVILLE, N. C.—The Asheville Cycle and Automobile Company, on Lexington avenue, utilize the surplus heat from the boilers of an adjacent laundry to heat their garage. A hood was placed over the boilers, and an electric fan draws the heated air into the garage.

GERMANTOWN, PA.—George Waldman has submitted plans to the Pomeroy Construction Company for the erection of a two story and basement brick garage on Johnson and Jefferson streets. The building will have a finish of ornamental stone and terra cotta trimmings.

CREIGHTON, NEB.—The Creighton Automobile Company have reorganized, and will install a complete modern garage and repair shop. They will also carry a full line of supplies and accessories. F. C. Largen will have charge of the repair shop. They will handle the Jackson car.

INDIANAPOLIS, IND.—G. H. Westing & Co., who have been engaged in the motorcycle business for a number of years, will add a line of automobiles as soon as a new building they have leased is completed. The building will be a three story, fireproof structure, located in North Delaware street, in Motor Row.

COLUMBUS, O.—The Love Garage Company, recently incorporated, has been organized by the election of J. P. Love, president, and F. E. Love, secretary and general manager. The concern will occupy its new building on North High street by December 1. The structure will have 15,000 square feet of space. The concern will handle the White steamer and gasoline cars.

Boston, Mass.—The Peerless Motor Car Company of New England have taken a twenty years' lease of a new six story building to be erected on Beacon street, between Raleigh and Deerfield streets. The building will have a frontage of 90 feet and an area of over 10,000 square feet, and work on it will be started at once. The deal was put through by the real estate firm of Whitcomb, Wead & Co., of which Lawrence Whitcomb, treasurer of the Na-

tional Brake and Clutch Company, is the senior member.

Kennebunkport, Me.—Henry Heckman is building a 40 foot addition to his garage.

WAKEFIELD, MASS.—Plans are being prepared for the erection of a garage at 503 Main street.

STRONGHURST, ILL.—James Brewer has purchased the Fred Fox garage, and will continue the business.

New Haven, Conn.—The Yale Field Construction Company will erect a concrete garage at 7 Dixwell avenue.

FORSYTH, GA.—The Georgia Automobile Comany, agents for the Ohio car, will soon open branch offices in Macon and Atlanta.

KANSAS CITY, Mo.—Hall Brothers, agents for the Dorris car, have moved into permanent quarters at 1110 East Fifteenth street.

OKLAHOMA CITY, OKLA.—The White-head-Thurber-Backus Company will soon move into their electric garage at 13 Harrison avenue.

JACKSON, TENN.—The Dixie Motor Works expect to be in full operation in a new automobile shop and garage by the first of the month.

PENN YAN, N. Y.—A garage and repair shop is soon to be erected in the rear of the Sherman House. The upper floor will be used to store carriages.

St. Louis, Mo.—The Central Garage Company have opened a new place at the corner of Twelfth and Chestnut streets. C. C. James is president.

GAINESVILLE, FLA.—The Gainesville Motor Car Company have taken possession of their new garage. C. W. Hill and G. Henry Davis are the proprietors.

NORWALK, OHIO.—A. W. Carpenter & Son have opened an automobile and supply store at 15 Maple street. They have the agency for the Maxwell car.

CHIPPEWA FALLS, WIS.—The "Home Gaage" has been opened by the Barker Automobile Company, representative of the Jackson and Fuller. The building, recently completed, is situated on East Spring street.

MISHAWAKA, IND.—John Z. Wilklow will erect a 100x50 feet two story brick garage at 214 Main street, on the site now occupied by his residence. The present building is being moved to the rear to afford room for the garage.

MILWAUKEE, Wis.—A. Bonnell has been appointed general manager of the New Milwaukee branch of the Mitchell Motor Car Company, of Racine, Wis. The company have erected a 60x120 foot garage at 526 and 528 Broadway.

COLUMBUS, O.—The Broad-Oak Automobile Company, which has been operating a garage and sales agency on East Broad street, has been reorganized by the election of Charles C. Kouns, president, and A. B. Whitney, vice president, to succeed O. W. and M. F. Loofborrow, respectively. Dr. I. Hoch remains as secretary and treasurer. The concern has the agency for the Pierce-Arrow, Hudson and Chalmers-Detroit.

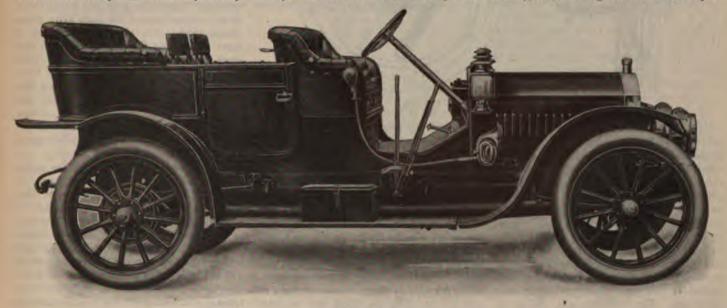
### DESCRIPTIONS OF NEW VEHICLES AND PARTS.

#### Novel Elmore Two Cycle Motor-Elmore 1010 Models.

There are a number of remarkable changes in the design of one of the models of the Elmore Manufacturing Company, of Clyde, Ohio, for 1910. The company will manufacture two chassis models for next year, known respectively

case compression used in the Elmore cars for years, but the 46 horse power motors are of entirely new design, known as the high duty type, using cylinder precompression, which is accomplished in the following manner: The cylinders have a double bore, and double concentric pistons are used. The lower portion

The incoming gas is drawn into the annular chamber D during the entire downward stroke of the piston. The gas passing from the carburetor through the manifold A, into the distributor E (which resembles a rotating valve on a steam engine, and is driven by a gear from the crank shaft), then through the distributor port



ELMORE MODEL 46.

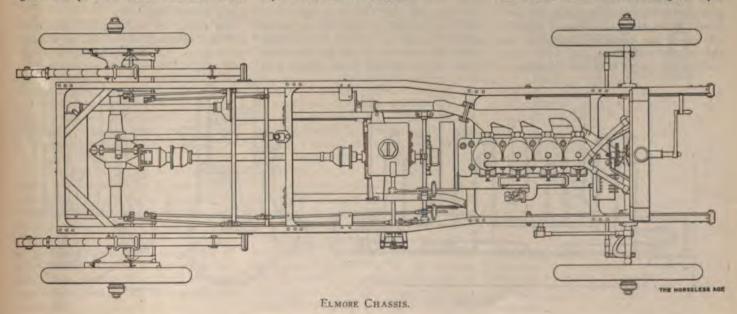
as Model 36 and Model 46, of which the former will be equipped with either a touring car, a demi-tonneau or a landaulet body, and the latter with either a seven passenger touring car or a limousine body.

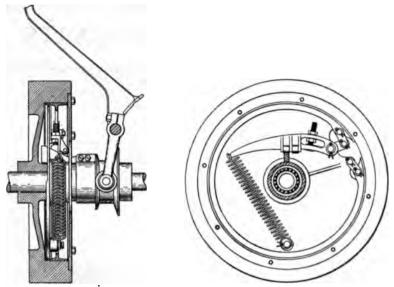
The motors of both models are four cylinder, two cycle, water cooled, with 4½ inches bore and 4 inch stroke. The 36 horse power motors use the crank

of the cylinder, where the new charge of gas is compressed before being admitted into the explosion chamber, is 6½ inches in diameter, while the upper portion, where the firing takes place, is 4½ inches in diameter. The four cylinders are cast separately and a five bearing crank shaft is used. The pistons are fitted with three compression rings at the top and two at the bottom.

B and pump by pass C, entirely filling the annular chamber D around the piston and below the firing chamber.

At the same time the gases in chamber D have been compressed in No. 2 cylinder while the previous operations were taking place in No. 1, No. 2 piston moving up while No. 1 moves down, forcing the new gas through the by-pass of No. 2 into the distributor, which has now changed its po-





ELMORE EXPANDING RING CLUTCH.

sition to admit the new gas, and on through port by-pass F, and ports H into the combustion chamber, where, upon being compressed, the gases are ignited, and at the conclusion of the downward stroke of the piston escape through port K. There is no intermingling of new and old gases, for several reasons. In the first place, there is not time enough; and the escape of the exhaust gas through the port K has an ejector effect, creating a tendency to draw in the new gas through a partial vacuum caused by the rapid discharge of the exhaust gas. The incoming gas, owing to the timing of the inlet port and the shape of the deflector plate on top of the piston, must first pass to the top of the cylinder. then filling the partial vacuum caused by the discharge of the spent gases. The motor fires 1-3-2-4.

The Model 36 motor is a simple three port motor. The top of the piston is flat, with a deflector cast on the inlet port side, while a back firing screen is located in the transfer port. The pistons are also fitted with bronze bushings in which the piston pin works, while the piston pin itself is solid nickel steel and is clamped firmly in the top of the connecting rod. The top end of the connecting rod, after being bored, is split so as to permit tightening to

the piston pin with a set screw. The rod itself is of drop forged steel, with the lower bearing cap of manganese bronze held in place by two studs. The lower connecting rod bearings are 1½ inches in diameter and 1½ inches long.

The crank shaft, which is of high carbon steel drop forged, has five main bearings, 3½ inches long by 1½ inches diameter, and is heat treated and ground. The crank case is of aluminum alloy and cast in two pieces with four separate compartments, which are used as compression chambers, as well as for oiling the crank pin bearings on the Model 36 motors, but for oiling purposes only on the Model 46 motors. The cylinders are also lubricated by the special Elmore system, the oil being forced into the intake pipe by a mechanical oiler, a method which insures that all cylinders are lubricated alike.

The cooling water is circulated by thermo-siphon action, and the cooling system comprises a belt driven fan and a tubular radiator. Ignition is by the Atwater Kent generator. The clutch is of the expanding ring type, being bronze to iron; the bracket carrying the expanding member running on annular ball bearings. This is the same clutch that has been used heretofore, except that improvements have

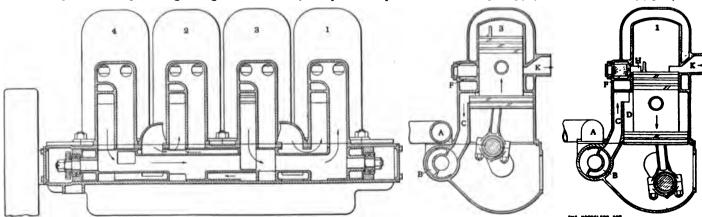
been made, making it self adjusting, self aligning, and automatically self slowing when thrown out. The clutch releasing yoke is equipped with rollers, thereby reducing the wearing surfaces. The transmission is the same as used formerly, that is, a three speed forward selective type, except that on Model 36 a vertical type is used, and on Model 46 a horizontal. The main drive shaft and countershaft are carried on annular ball bearings, and the whole contained in an oil tight aluminum case.

The propeller shaft is provided with two universal joints, the rear one being fitted to the squared end of the main drive bevel pinion shaft. The pinion is keyed to a taper bearing on the opposite end of this shaft and held in place by a lock nut. This bevel pinion shaft is mounted on two New Departure ball bearings. These hold the shaft securely in line at all times with the driven bevel gear. The differential, which is of the bevel gear type, is also carried on two ball bearings which are counterparts of those mentioned above.

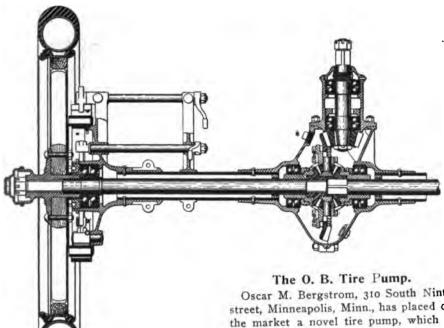
The rear axle, while it is of the same floating type, differs from most others of this type in that it does not require the total tearing down of the rear axle to remove the differential. The live axle shafts are not held in place by lock nuts inside the differential bevel gears, but instead are squared and slip into the differential gears. The shafts are held from working out endwise by a shoulder next to the outer ball bearing, which is also of the New Departure type and designed to take end thrust as well as radial load. The bearing in turn is held in place by an adjusting nut. The outer or wheel end of the live shaft is also squared and fits into the squared hub barrel with a lock nut outside.

The front axle is a single piece I section drop forging, with spring pads forged integral. The knuckle pins are hardened and ground, and fitted with force feed grease cups. The tie rod between the two steering knuckles is placed back of and protected by the front axle.

The wheels are twelve spoke, both front and rear, with the front carried on annular ball bearings. The tire equipment on Model 36 is 34x4 inches; on Model 46, 36x4 inches.



ELMORE HIGH "DUTY" Two Cycle Motor.



SECTIONAL VIEW OF REAR AXLE (ELMORE).

The steering wheel is 18 inches in diameter, and the spark and throttle levers are located on a stationary quadrant on top. The steering gear consists of a bevel gear and pinion.

The frame is cold pressed nickel steel of channel section, inswept in front to assist in short turning, and dropped at the rear, to give a lower centre of gravity. The speed control lever and emergency brake lever are set at a comfortable angle to insure ease in operation. The brake pedal and clutch pedal are of the sickle type, giving great leverage and thereby making operation easy. There are two sets of brakes, both operating on the 16 inch rear wheel brake drums, and working through equalizers, thus reducing the possibility of skidding. The internal brakes are the emergency, and operated by hand lever at the driver's right, the service brakes are the external ones, and are operated by pedal.

The gasoline tank is located under the front seat and holds 15 gallons, while the lubricator holds 5 pints of oil. The springs in front are semi-elliptic, 42 inches long, with three-quarter elliptic scroll, 52 inches long, in the rear. The wheel base of Model 36 is 110 inches, and that of Model 46 120 inches.

The torque is taken on a pressed steel spring cushioned rod. All brake cables are carried through to the inside of the frame, leaving the outside entirely clean. All cars are equipped with two gas headlights, generator, two oil side lamps, one oil tail lamp, horn, muslin cover, tool kit with special wrenches, wheel puller and jack. The weights are given as 2,400 pounds for Model 36, and 2,800 pounds for Model 46.

Oscar M. Bergstrom, 310 South Ninth street, Minneapolis, Minn., has placed on the market a novel tire pump, which is attached to the hub of one of the road wheels and operated by the motor while the wheel is jacked up, by holding it from rotation by means of an anchor chain. The pump is exceedingly simple for a two cylinder pump, a good many parts having been saved by special construction. A double piston is employed, which permits of doing away with one connecting rod and one wrist pin, and there is only one bearing for the whole crank. Aside from the two valves there are only three moving parts, the double piston, the connecting rod and the crank. The double piston arrangement possesses the advantage that it gives a very long bearing on the cylinder walls, thus reducing the friction when pumping against high pressure.

Instead of the ordinary crank shaft a disc is used which is provided on one side with four adjustable, leather faced jaws for attaching the pump to the hub, and the other side of the disc forms one race of an annular ball bearing, the other race of which is integral with the cylinder casting. In the annular ball bearing mentioned to inch balls are used. The pistons are fitted with two rings at each end. These rings are first turned eccentric, then split and reground to perfect size on three sides, to insure a perfect fit. Between the two ring grooves an oil groove is turned in the piston to insure perfect oiling of the cylinders. The main bearing is packed in grease, and one oiling of the pump is claimed to last for a long time.

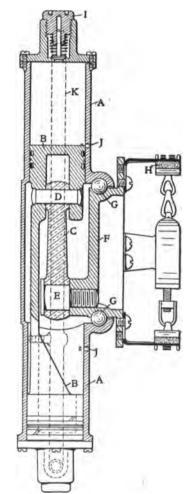
The discharge valves of the pump are of the same construction as the exhaust valves on gasoline motors, and before being assembled are tested to 200 pounds pressure, to insure against leaks. It has been found that the greatest care must be exercised in grinding the valves in order to make them perfectly airtight at high pressure. The air is admitted to the cylinders through port holes in the cylin-

der walls at the end of the suction stroke, these port holes being covered with fine mesh wire screens to exclude dust and dirt

After the double piston is assembled with the cylinder it is moved to one extremity of the stroke, and the outer end of that cylinder is then turned flush with the end of the piston; in fact, a cut is taken over both the piston head and the end of the cylinders at the same time, whereby it is insured that absolutely no dead space is left in the end of the cylinder, and the same operation is then repeated for the end of the other cylinder.

This pump is designed primarily to be operated from the rear hub of the car, but it can also be fitted to be operated from the motor of any exposed shaft, or it may be driven through spur or bevel gears, chain or belt. The inventor, however, thinks that the average owner would prefer to use the rear wheel for driving the pump, as there would always be some additional expense in fitting the pump for driving it from the motor or any other part, unless the manufacturers of cars make special provisions for it.

Practical tests with this pump are said



O. B. Auto Power Pump.

A A, pump cylinder; B B, double piston; C, connecting rod; D, piston pin; E, crank pin; F, crank disc; G, annular ball bearing; H, friction clamp for fastening pump to wheel hub; I, delivery valve fitting; J J, inlet valve ports; K, delivery pipe.



O. B. TIRE PUMP.

to have shown that a flat 34x4 inch tire can be fully inflated in one minute, including the time required for taking the pump from the tool box and placing it there again. At a speed of 200 r. p. m. the pump will fully inflate such a tire in 40 seconds, and other sizes in proportion, and it may be run as high as 300 revolutions. The compressed air delivered by the pump may also be used for cleaning cushions and machinery, and for this purpose a special concentrating air nozzle is used.

The weight of the pump complete is 8 pounds, and it is regularly supplied with 12½ feet of hose, with a hose connector

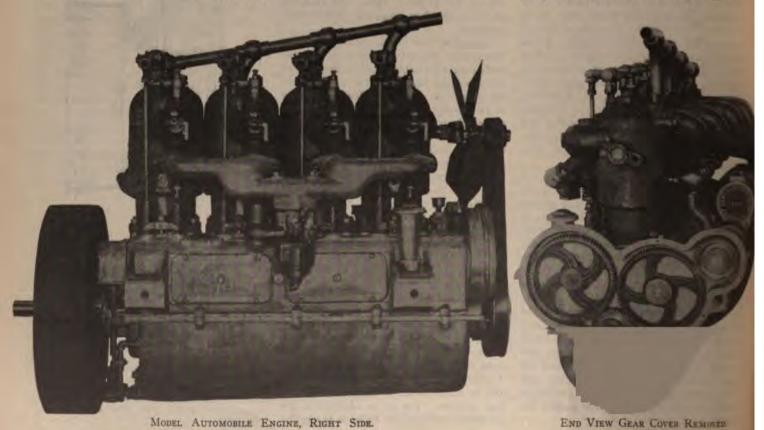
at the free end, as shown in the illustration. The pump is said to be made from the best of materials and to embody high class workmanship. All pumps are shipped to fit one size hub, but they can be easily fitted to any size hub over 3 inches in diameter by simply moving the four leather faced jaws in or out, and shortening or lengthening the binding chain. After the adjustment is once made for a particular size of hub no further adjustment is necessary. Two screw hooks are furnished with each pump, which are screwed into the rear ends of the two running boards respectively, and left there permanently. When it is desired to inflate the tires the pump is placed over the hub and locked there by tightening the adjusting screw on the tightening chain. Then the anchor chain is placed over the screw hook, the motor is started up, the rear wheel to which the pump is attached is jacked up, the high gear is engaged, and the clutch let in.

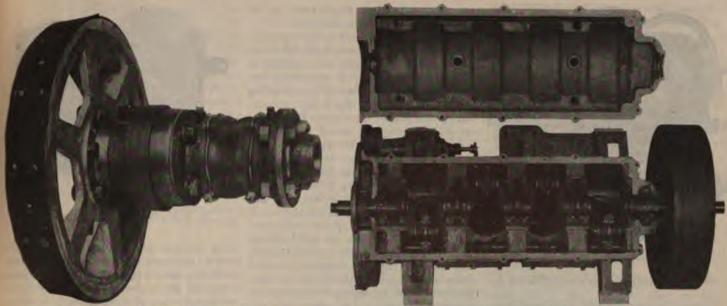
The Jewel Carriage Company, of Cincinnati, Ohio, inform us that the models which they had on exhibition at the Atlanta Show were exhibited in the name of the Ohio Motor Car Company, the automobile end of what was formerly the Jewel Carriage Company. The bore and stroke of this motor are 4½ inches each, and not 4¼ inches, as stated in our report, and the company say that they do not claim 40 horse power for the car, but 35 to 40. The wheel base is 110 inches, instead of 115 inches. They also make another model, which is known as 40A and has a bore of 4¼ inches and a stroke of 4¾ inches.

#### Model Gas Engine Auto Power Plants.

The Model Gas Engine Works, of Peru, Ind., are building this season five different sizes of automobile engines, combined with clutches and double universal joints. All of the engines are four cylinder, and the cylinder sizes are as follows: 4x5 inches (30 horse power), 41/4x5 inches (35 horse power), 41/2x51/2 inches (40 horse power). 5x51/2 inches (50 horse power), 5x6 = (55 horse power). The arrangement of the valves-exhaust valve in the head and btake valve in a side pocket-as well as operation through a single cam shaft remains the same as formerly. The former practice of using an I section in the construction of the crank case, with steel rolrunning clear through, one end of which supports the cylinders, while the other bolds the adjacent crank shaft bearing caps, thus relieving the crank case of the working stresses, has also been retained. The piston heads are made convex as formerly, and the cylinder heads are finished on the inside to eliminate trouble from carbon deposits. Following are some of the most important changes for the coming season:

A self contained oiling system has been adopted of approximately 2 gallons capacity, making it possible to run from 600 to 800 miles without adding lubricating oil. The cam gears are enclosed in an oil tight compartment to eliminate noise. An idler pinion has been inserted between the crank shaft pinion and the pump gear, thus getting the drive of both the pump and magneto away from the cam shaft gear. The pump and magneto are now set on opposite





CLUTCH AND DOUBLE UNIVERSAL JOINT.

BOTTOM VIEW OF ENGINE-LOWER CRANK CASE REMOVED.

sides of the motor in such positions that both can be removed quickly without interfering with other parts. Flexible couplings are inserted between the pump and magneto and their respective driving gears.

The lower part of the crank case is so arranged that it acts only as an oil reservoir and a cover, and is entirely independent of the bearings, thus making it possible not only to remove the lower half of the casing quickly but to run the motor with all bearings in place and the lower half of the casing removed, thus permitting of readily making any adjustments required. A vent pipe is provided so designed that it acts as a filling cap and makes it impossible for oil to escape.

All bearings are of the genuine nickel Babbitt die cast type. All bearing caps are of manganese bronze into which the die cast bearings are fitted. The cam shaft is a solid forging. The cylinders are bored, reamed and ground. The pistons are all finished except grinding, then annealed so as to prevent change of shape and afterward ground. The piston pins, rocker arms, rocker arm pins, valve lifters and all other parts on which there is any wear are also hardened and ground. The gradual increase of the exhaust pipe as each cylinder leads into it is clearly shown in the photograph, the outlet being approximately four times the area of the exhaust port from each cylinder. Special atention has also been given to the question of accessibility, as may be judged from the illustrations. The motor is said to be very light for the horse power developed, owing largely to the steel rod construction referred to above, yet the bearing surfaces are claimed to be large, and this, together with the five bearing shaft, is claimed to insure a motor of long

The clutch is of the cone type, covered with Raybestos (six engaging springs being placed under the Raybestos to insure smooth working of the clutch), and is equipped with ball bearing release collar. It has a flange connection for the double universal joint. The universal joints are of the well known slot and trunnion type, with all parts hardened and ground, and is protected by a boot.

#### Gilliam Engine Hood Cover.

One common annoyance attendant upon the operation of an automobile during the winter is the difficulty experienced in starting the motor after it has stood idle in the cold for any considerable length of time. Exposure to a low temperature chills the cylinders, the intake piping and the carburetor to such a degree that an explosive mixture can only be secured after considerable labor at the crank, and sometimes only after the cylinders have been primed. So long as the motor and its auxiliaries are kept warm starting is readily performed, and many operators make a practice of throwing a robe over the hood and radiator when the engine is stopped, thus confining the heat so that cooling shall be retarded as much as possible, and so that the motor and intake pipes shall be reasonably warm even after a stop of considerable duration. This is, however,



THE GILLIAM ENGINE HOOD COVER.

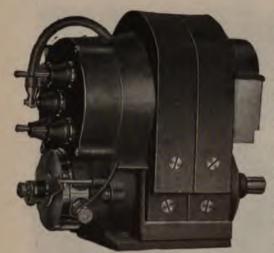
rather a crude and not entirely satisfactory expedient.

In order to retain the heat of the motor in an effective manner the Gilliam Manufacturing Company, Canton, Ohio, has brought out the Gilliam engine hood cover. This consists of a lined, heat insulating fabric covering, so arranged as to fit closely over the entire bonnet and radiator front of any make of car. Three qualities are made, the materials used being, respectively, as follows: Waterproof rubber drill, lined with heavy wool felt; pantasote, with the same non-conductive lining of wool felt, and genuine hand buffed grain leather, with wool felt lining.

As soon as the motor is stopped the hood cover is put into place, and radiation and convection of engine heat are thereby greatly reduced. The cover may be used as a lap robe or driver's storm cape while the car is running, and in case repairs become necessary it may be used for the mechanician to lie or kneel upon.

#### Pfanstiehl Magneto.

The Pfanstiehl Electrical Laboratory, of North Chicago, Ill., have placed on the market a new magneto of the lowhigh tension type, in which a low tension current is generated in the armature, which is transformed into a high tension current by a stationary induction coil. The chief point of difference between this and other magnetos of the same type is that the induction coil is built into the magneto, being located in the hollow of the permanent magnets, above the armature. The manufacturers recommend the use of the magneto in connection with a complete auxiliary battery system, using two sets of spark plugs, so that no matter what may happen to one system the other will not be affected. The company have had con-



PEANSTIEHL MAGNETO.

siderable experience in manufacturing ignition coils, and the coil of the magneto is manufactured by the same methods as their regular coils and is guaranteed for five years against breakdown. The high tension windings are sealed up in a watertight case.

The magneto is provided with liberal bearing surfaces and has provision for holding a considerable quantity of oil, so that it is not necessary to give it frequent attention in this respect. It is claimed to generate a spark at a very low speed of rotation, and to afford a wide range of spark advance. When the magneto is used in combination with a battery system, a kick-switch is fixed to the battery coil by means of which it is possible to change from battery to magneto and vice versa.

#### The Ever Ready Taximeter.

The Auto Improvement Company, 316 Hudson street, New York, have recently added a taximeter to their well known line of accessories. The machine contains a number of novel features, and a careful examination shows that considerable thought has been put into the design to render the instrument strong and durable. The casing is a single carring with both front and rear covers litted so as to break joints and render it both dust and water proof. The mechanism is driven by a worm about 8 inches in diameter, which drives a four toothed star wheel on the end of the flexible shaft. This shaft makes about 160 turns to the mile with the average taxicab wheel, or about forty revolutions per minute. This comparatively slow movement reduces the wear and strain on the flexible shaft, and the comparatively large diameter of the worm gives a high peripheral speed which makes it to a certain extent self cleaning by virtue of centrifugal force.

The most novel feature of the machine itself is probably the fact that restoring the flag to the disengaged position does not set back the fare indicating wheels to zero, the full amount of the last fare remaining on the dials until the flag is pulled to the engaged position for the next fare.

A spring latch is fitted to the flag which must be pulled out before it can be moved from either the engaged, non-recording or vacant position to any of the others. The back of the machine contains five recording dials for the use of the owner or company. The first of these shows the amount of initial fares, the second that of the extras, and the third the amount due for mileage and waiting time in excess of the initial fares. All of these dials read in dollars and cents. In order to find the number of trips that the machine has made during the day the amount of initial fares is divided by the amount of the initial fare. The fourth dial shows the total mileage covered by the machine in miles and tenths. and the fifth the total recorded or "live" miles in miles and tenths. Both the clock key and the key for setting the "extras" are secured to the machine; in other words, the machine is stem winding. Special attention has been given to the securing and sealing of all parts, to make the machine as water, dust and fool proof as possible.

#### U. & H. High Tension Switch.

In connection with the latest type U. & H. Master magneto, intended for dual ignition, which are imported by the J. S. Bretz Company, Times Building, New York, an improved form of high tension switch, which is mounted integral with the coil box, is furnished. The high tension switch has been one of the most trouble-



EVER READY TAXIMETER.



U. & H. HIGH TENSION SWITCH.

some features of the dual system of ignition, owing to the difficulty of securing sufficient insulating surface between the contacts. By mounting the switch directly in the coil box, a construction is said to be obtained, whereby the requisite amount of insulating material can be employed without making the device cumbersome and unsightly.

With this magneto, practically two systems of ignition are secured, both systems operating through the same set of spark plugs, thus avoiding the fouling of the idle set where two separate systems are employed. The battery timer is incorporated directly within the magneto, and is an integral part of same. The coil, which is located on the dash, is in use only when the battery system of ignition is being employed.

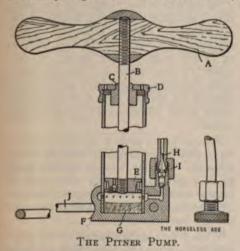
#### The Pitner Automobile Pump.

D. H. Lawrence Company, Sterling, Ill., manufacture a hand pump for inflating automobile tires, which is claimed to be of particularly substantial and durable construction. A sectional view of the pump, with the middle portion of the pump barrel cut away, is shown herewith. The general arrangement of the pump is conventional, but the details have all been well worked out. The wood handle A is made of selected, seasoned hardwood and driven into a brass collar. Then a hole is drilled through one side of the brass collar and the wood, and a thread is cut through the lower side of the brass collar and slightly into the wood. The top end of the piston rod B, which is cut with a thread for a length of 13% inch, is screwed into this hole, cutting its own thread in that portion of the wood which has not been tapped. It is claimed that the handle cannot come loose or split in use.

The piston rod is guided in a hardened steel bearing C, which is securely threaded into the pump cap D, which latter is machined out of solid rod brass. The piston E of the pump consists of a solid rod brass disc, which is securely screwed to the piston rod. The outside diameter of the piston is 0.004 inch less than the bore of the barrel. A thick leather strip is located in a groove

cut in the outside surface of the piston disc, and serves as a packing ring. The leather strip does not quite fill the groove, but leaves an empty space underneath it, which space communicates through four air passages with the compression chamber, so that as the piston is forced down the compression in the chamber forces the packing ring outward against the wall of the barrel. The pressure of the packing ring against the barrel wall is, therefore, always in direct proportion to the pressure beneath the piston, and is released instantly on the upward stroke. A ball check valve is located in the piston for transferring the air to the lower part of the barrel. The pump barrel is made of 14 gauge cold drawn seamless

The lower end of the pump barrel is set into a brass base F, and is securely soldered or sweated. There is an interior circumferential groove in the base which becomes a circular passage when the base is attached,

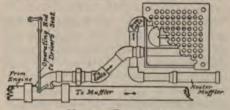


and there are twenty little holes through the wall of the barrel, spaced evenly around the circumference, whereby the compression chamber is placed in communication with a circular chamber in the base communicating with the outlet opening. A thick felt disc G is placed at the bottom of the pump barrel, filling it to within a short distance of the twenty holes in the wall. This felt serves for retaining lubricating oil. As soon as the piston on its downward stroke closes the holes in the wall of the barrel an air cushion is formed which makes it impossible to bump the piston against the bottom of the pump with any force.

A special hose connection is used for connecting the hose to the pump. A small hollow metal part H, referred to as the hose wedge, is forced into the end of the hose, expanding it, and a coupling nut I is then drawn tight on the connection piece of the base, forcing the conical head of the hose wedge against the conical seat in the connecting piece. A ball check is provided at this point, and a small slot is made in the head of the hose wedge to prevent the ball from closing the opening in the wedge. The pump is provided with a hinged foot piece J, which folds up to the pump barrel when the pump is not in use.

#### American Auto Heater.

The American auto heater marketed by Flavius G. W. Sudrow, of Buffalo, N. Y., is designed to promote the comfort of automobile users during the cold and chilly months. It comprises a T connection inserted into the exhaust line ahead of the



HEATER COMPLETE.

muffler. In this T is a butterfly valve which regulates the amount of exhaust directed through the heater coils. A portion of the tonneau floor is removed and a register inserted, directly underneath which are the coils of the heater. At the outlet end of the coils is a small muffler which allows a free circulation of the exhaust gases through the coils, but prevents any noise therefrom. The amount of heat can be regulated from the driver's seat.

#### Binks Compound Air Pump.

The Star Brass Works, of Chicago, Ill., have brought out an improved model of their Binks compound air pump. The pump can be used either for portable or stationary purposes. It has been changed from their former model in that the cylinders are now placed side by side instead of tandem as before. This latter arrangement is claimed to add greatly to the ease of operation, since a different leverage can be obtained for the separate cylinders. Another step in the direction of easy operation is the use of large roller bearings in the loops of the plunger rods. The cylinders are of seamless brass tubing. The large cylinder measures 4x51/2 inches, and the small cylinder 21/2x5 inches.

On the forward stroke the air is forced into the high pressure cylinder, and on the return stroke it is compressed into the tire. The pump is fitted with three valves, one valve preventing air from returning to the pump after being discharged. The valves,



BINKS COMPOUND PUMP

plunger rods and all connections are of brass, but the frame and its parts are of iron, and enamelled.

#### Cameron Automobile Cranes.

The Cameron Engineering Company, of Brooklyn, N. Y., are producing a very complete line of portable cranes and trolleys, especially adapted for use in manufacturing and repairing automobiles. The portable cranes are made in five sizes, from one-half ton up to and including 3 tons. They are constructed of channel steel with four small truck wheels, which are so arranged that in turning corners the front or guiding wheels will not cramp and stick. Any style, chain block, hoist, may be used from the single to the triplex. The I ton crane is perhaps most applicable to ordinary automobile work, and has a lift of 7 feet 4 inches with the triplex block. The crane is



PORTABLE PULLEY BLOCK CRANE.

so designed that it can be backed in between the wheels of an auto to remove the motor or other members of the car.

Their trolleys are specially adapted to large factories where many cars are being constructed, as by suspending an I beam above the chassis assembling floor and using the trolley a chassis when completed can be picked up and carried out of the way by one man and without interfering with the other workmen. The trolley has four flanged wheels, which are carried on ball bearings and set at the proper angle to insure full bearing on the surface of the I beam. The trolley tramways can be provided with turntables and switches so as to cover every part of the factory. The turntable is a short I beam supported from above, carried on rollers which in turn. are carried in a steel angle circle with the flat flange turned into the centre.

# COMMENTS AND QUERIES OF READERS.

#### Air Cooling Two Cycle Motors.

Editor Horseless Age:

There seems to be a few points in relation to the two cycle engine which should not be overlooked in connection with Mr. Clough's able article on "Air versus Water Cooling." I believe the two cycle engine has a very great future for auto work, and on this account it should not be neglected. It has no valves nor valve jackets, so there can be no valve pitting, and since the cylinder heads are symmetrical they can be machined inside and out and be quite certain to expand and contract without distortion. On these accounts the second "end" mentioned by Mr. C. is hardly applicable to the two cycle, especially if of the air cooled type.

The fourth "end" also hardly applies because the new charge is not drawn into a hot cylinder through hot valves, but into a relatively cool crank case. Once in this case every bit of heat it absorbs increases its pressure and certainty of quick transference and increases rather than decreases the size of the transferred charge.

This leaves only ends one and three to be sought for in the well made two cycle engine. Lubricating oils can be had with flash temperatures well up to 700° Fahr., so there need be little thought given the cooling problem if proper oil is used and lubrication the only requirement

lubrication the only requirement.

The third "end," prevention, not of self-ignition, for this is not objectionable, but of preignition, by which I mean selfignition so early as to result in back pressure and loss of power, is in this type of engine the great desideratum. Preignition may result from excessively heated walls, high compression, over-fat mixture, hot carbon particles left by excessive lubrication or by faulty design of motor, which may have parts not properly cooled. In a well designed motor the first and last of these should not exist. Carbon deposits should not be formed, but if formed should be cleaned out, by scraping if necessary.

The one ever-present cause of heat troubles is the quality of the mixture, particularly in conjunction with the compression. In general the lower the compression the hotter the walls may be, or with a constant wall temperature the fatter the mixture may be. There seems to be exceptions to this statement, due to causes not necessary to include here; but the point is that preignition can often be prevented by adjusting the mixture. Hot walls and lean mixtures are conducive to great economy, and because of this fact a low compression engine with hot walls may be more economical than one of

higher compression with colder walls. All of these things favor the air cooled two cycle engine.

The only fly in the ointment is the fact that the average user judges his motor by its maximum performance rather than by its average. He may not need its maximum capacity but a few times per year, and if wise will be satisfied to drive a little slower, take the low gear a little sooner, or even ignore a little pounding on these few occasions rather than avoid them by increased complication and general lowered economy.

CHAS. E. DURYEA.

#### Rejuvenating Old Dry Cells.

Editor Horseless Age:

In the Scientific American of October 23 is a short article by Dr. E. M. Hanson, in which he states very positively that old dry cells may be rejuvenated as follows: Midway between carbon and zinc hore a & inch hole to within 11/4 inches of the bottom. On the opposite side of the carbon bore a he inch hole 3 inches deep. In the larger hole pour I ounce c. p. hydrochloric acid. and follow with I ounce water. Seal with stationers' sealing wax. Being interested we tried it. After the liquids were in (which, by the way, took forty-eight hours) the cells tested by ammeter between 3 and 4, but the next day they had dropped back to I, where they remained at last accounts. I would like to know if anyone has tried this plan with any better success.

We have tried various methods before, but always without success, and I would like to ask if it is possible to bring a dead cell up to a working amperage.

JOHN J. SHAW.

# Magneto Ignition of Motors at Slow Speed.

Editor Horseless Age:

As a footnote to my contribution on this subject, page 501 of your issue of November 3, 1909, you say: "We would like to know what Mr. Hess means by 'a spark of full value.' He certainly cannot mean that his magneto will generate as large a spark at 35 r. p. m. as it will at any higher speed of revolution. Are we to understand that at 35 r. p. m. the magneto will generate a spark of sufficient volume to ignite a charge just at the limit of ignitibility; that is to say, a charge so poorly dosed and so much contaminated with spent gases that it is barely possible to ignite it by the most powerful spark?"

To answer your question absolutely would be necessary to know what you have in mind by a large spark. I did not refer to a large spark: I did refer, and as you quote me, to "a spark of full value." By full value I mean a spark that will ignite such a mixture as is apt to be present when a motor is running at its slowest speed. If the mixture is so poor or so rich that it is not ignitible then no spark will ignite it. The main point is that the magneto that I refer to, which is the one my company is now handling, will give a spark that will ignite a proper gasoline mixture at as low a speed as 35 r. p. m. I believe that I am correct, and I know that I am correct so far as the actual testing out of a considerable number of magnetos of various makes is concerned; that this ability to give a spark having ignition power, or even any spark, even in air, at so low a speed as 35 r. p. m., is found in no other

As the editor has brought up the question, I should like to have a few words to say concerning sparking in general. Every automobilist is familiar with such phrases as "a fat spark," "a hot spark," "a cold spark," "a large spark," etc. Possibly these mean something to someone, but it is apparently the fact that there is no actual definition of the real meaning of these various terms.

This confusion could be avoided if terms were used that referred to absolute measurements. Possibly the most valuable quality of a spark is that which can be defined by the amount of heat energy it contains. That heat energy is rather difficult of measurement by ordinary means.

When I took up this matter of the magneto I was met at the outset with this confusion of terms and definitions of sparks. I therefore first tried to procure instruments which would allow me to measure the heat energy of a spark. Being unsuccessful in that I devised an apparatus which was shown at last winter's shows in New York. Briefly, that apparatus consisted of a small vial or tube into which two wires, having a proper spark gap, were sealed hermetically. This tube was enclosed in a second rather larger one containing a definite quantity of water at a known temperature. Into this water there was inserted also a bulb and the lower end of a sensitive thermometer; the whole was then enclosed in a specially made Thermos bottle. The two terminals were then connected to the magneto in the same way that a spark plug would be connected. The magneto was then run at a low speed for a certain definite time, and the heat delivered to the water was read from the thermometer. The same test was then repeated with the magneto running at a different speed. A full series of such tests was made at various speeds, ranging from 35 r. p. m. up to 2,800 r. p. m. of the magneto. Each test occupied ten minutes continuous running.

As at the beginning of each test the water was of the same quantity and at the same

temperature, the thermometer gave comparable readings. The influence of radiation from the surface of the apparatus was reduced to an entirely negligible amount, since the Thermos bottle in which the whole was enclosed guarded against any appreciable loss of heat to the surrounding atmosphere during the period of a test. It follows that readings of the thermometers were in direct ratio with the total heat energy.

A series of seven of the best known European and American magnetos were tested out in this way among others.

As it is well known that sparking under pressure is more difficult than in the open air, a small tank was constructed having a plate glass front and having four spark plugs in the back. This tank was then charged with compressed air and the magneto connected to these four spark plugs. The speeds at which a magneto would give sparks in this tank were noted, and various magnetos compared in this respect also. The precaution was taken to calibrate the plugs among one another before actual readings were made. This was done because it was found that spark plugs had very great variations even when the spark gaps seemed to be alike. Out of a very large number of plugs tested, all of one make, only a small percentage were found HENRY HESS. to be at all alike.

#### "Flying Piston" Explained.

Editor Horseless Age:

Say to your correspondent, "H. F. B.," that a "flying piston" usually means the device used in gas engines of the early '70s, wherein the cylinder stood vertically and the explosion shot the piston upward against gravity. This arrangement permitted high piston speed during the expansion of the gases. The exhaust escaped while the piston was highest. In falling a rack and pinion with a ratchet caused the weight of the piston to turn the shaft. In later years the term "free piston" was used, and the motors were built two cylinder, two cycle, cylinders being opposed and the pistons not restrained to a definite stroke by a crank shaft. An explosion in one cylinder drove the pistons toward the other firing chamber until stopped by the compression therein. The higher the speed the higher the compression. As soon as the cylinders warm up the compression pressures suffice to ignite the charges, and there is practically no such thing as preignition, because the pistons are free to go back whenever the pressure is sufficient to reverse them. Power is taken off by a double acting ratchet lever attached at the centre of the piston rod. This engine is not only of very high efficiency, due to the high compressions which permit the use of lean fuel mixtures, but it is interesting just at present because, having no crank shaft, autos propelled by it are not within the scope of a recent CHAS. E. DURYEA. patent decision.

#### Differential on Propeller Shaft.

Editor Horseless Age:

Some time during the last few years some of the technical papers published a description of an axle used in one of the foreign cars with the differential on the propeller shaft, splitting the driving pinion in two parts, and compensating between the two parts. Can you give us an idea where we can find anything in the way of printed matter and drawings on this subject? The writer is familiar with the axles as found in this country.

D. E. R.

[Constructions in which the differential gear is placed on the propeller shaft or an extension of the propeller shaft are used in a number of European cars. Notable among these is the Mercedes shaft driven town car. The arrangement of the drive of this car was described in THE Horse-LESS AGE for September 2, 1908, page 290. The differential is located in its usual position at the centre of the rear wheel, but instead of having its axis parallel with the axis of the rear axle, has it at right angles thereto. The side gears of the differential connect with bevel pinions of unequal size, which mesh with bevel gears of corresponding size on the inner ends of the two rear axle shafts respectively. A similar construction is used by La Buire, which was described in THE HORSELESS AGE, February 20, 1907, page 263. A slight variation from this is used by the Fiat Company in their town car. In this the two bevel driving pinions are of the same size, as are also the two driven bevel gears, and to obviate interference of the pinion meshing with one gear, with the other gear, the propeller shaft carrying the differential is placed so as to make less than a right angle with the rear axle. This arrangement was illustrated and described in THE HORSE-LESS AGE of August 21, 1907, page 241.—ED.]

# Australian Patent Applications Under the International Convention.

Editor Horseless Age:

Under new regulations which went into operation on August 5 last, American, British and foreign applicants for Australian patents, to avail themselves of the International Convention arrangements, must file at the time of deposit of their application papers the usual certified copy of specifications and drawings and certificate of identity. This certified replica may be of the American, British or foreign application as filed or as allowed if it has reached that stage. Should such documents be in a foreign language a declared translated copy must be attached.

An extension of time of three months may be obtained in which to file the said certified copy, but application for such extension must be made at the time of filing. The Government fees for the extension amount to £2 for one month, £4 for two months and £6 for the limit of three months

PHILLIPS, ORMONDE & Co., Melbourne, Australia.

#### Quieting Noisy Gears.

Editor Horseless Age:

Can you suggest a practical method of eliminating or reducing the rattling noise in the planetary transmission of a two cylinder car, outside of replacing the gears? The rattle is doubtless caused principally on account of defective design, as the planetary transmission in other makes of machines works even quieter, even after considerable use. Possibly some of the owners of this model have been successful in remedying the fault and could suggest a remedy of the trouble.

S. H. Johnson.

[We would suggest that you try the use of boxwood sawdust and heavy grease in the gear, which has been found effective in quieting noisy clash gears. The sawdust is also known as jeweler's sawdust. The most certain way to render the gear fairly quiet, however, would be to provide new pinions.—Ep.1

#### Horse Power Tests.

Editor Horseless Age:

Last week I saw a brake test taken on a four cylinder, four cycle automobile motor of 4 inch bore and 4 inch stroke. The brake arm was 4 feet long, and a load of 25 pounds was balanced. The speed taken was 1,400 r. p. m.. The brake was tightened so as to balance 35 pounds, but the engine stopped before the lever was moved, and another trial with 30 pounds showed that the lever hardly was moved before the engine stopped again. The engine runs free without any load up to very nearly 2,000 r. p. m. Now, if you figure the b. h. p. you will get about 22. Do you call an engine like this a 22 b. h. p. engine?

Another test was made with a load of 20 pounds, and it was found that the speed was the same, 1,400 r. p. m. What should be the pull on the scale, and at what speed, to get what could be called a 30 b. h. p. engine? It looks like a foolish question, but you see I do not call the engine of which I have given you the test a 22 b. h. p. engine, and still it does figure out to this horse power. I think an automobile engine of 22 b. h. p. should pull 35 pounds if only at 600 r. p. m., but this we have to expect from a heavy duty engine. An engine like the above will be all right on good roads, but how will it be for hill climbing?

J. G. A.

[The brake arrangement used in the tests described by you was apparently of a rather crude nature. In using such a brake you must first balance it by means of a counterweight around the centre of the brake drum, otherwise the unbalanced weight of the brake arm will affect the result. To

show 22 horse power at 1,400 r. p. m. the pull or weight at the end of a 4 foot brake arm must be

$$\frac{22 \times 33000}{4 \times 2 \times 3.14 \times 1400} = 20.4 \text{ pounds.}$$

Of course, at lower speeds the pull corresponding to the same horse power is correspondingly greater. For instance, at half the speed, or 700 r. p. m., a pull of 40.8 pounds would be required at the end of a 4 foot beam to indicate 22 horse power, but, of course, if a motor develops a certain horse power at one particular speed the maker is justified in rating his motor at that horse power. No gasoline motor gives the same horse power through a large range of speed. Your test data contain no information enabling us to judge the special adaptability of your motor to commercial vehicle service.

The necessary weight or pull at the end of a 4 foot arm to show 30 horse power is 39.4 pounds at 1,000 r. p. m., 33 pounds at 1,200 r. p. m.,—Ep.]

# "Calculation of Chassis Springs." Editor Horseless Age:

I have been very much interested in the contribution by Messrs. Landau and Golden, but fail to see how they can make out an accurate spring specification on flexibility and oscillation periods only, neglecting the style of suspension. Why do designers incline the spring links? If Messrs. Landau and Golden would only take equation (5) in its entirety instead of substitution b = 0. their experiments for constants would have more value. The writer must confess his inability to see how any accurate data could be verified without taking the angle of the spring links. The proposition is Greek solution. Take a given spring, known deflection, with straight up links, incline them to 45 degrees, and the difference in flexibility is a surprise. This, of course, must be figured in conjunction with the camber of the springs and the length of the links. The beauty of this suspension is its easy riding qualities when "light" and the low stress in the springs for maximum load; in other words, enabling a much stiffer spring to be used for the same flexibility. Again, the writer utterly fails to see any other but "Equation 5, complete," and not the preferred one (7), which is very incomplete and misleading. ARTHUR M. LAYCOCK.

The above communication was submitted to Messrs. Landau and Golden, who reply to it as follows:

Editor Horseless Age:

The remarks of your correspondent, Mr. Laycock, are evidently due to his failure to understand the nature of the problem which we set ourselves to solve. The title of the article, "Calculation of Chassis Springs," clearly indicates what we intended to discuss, and we believe, as you remark, that we have covered this subject quite

thoroughly. Had we intended to take up the question of suspensions we would have been obliged to consider such matters as the angle of the links, the form and arrangement of the spring brackets, hangers, etc.

The matter of the inclination of the links is, therefore, entirely foreign to the subject, but we can say that it does not cut much of a figure provided we make the spring flexible enough in the first place. If your correspondent has experimented with straight up and inclined links, and found a marked improvement in the riding qualities, the springs on which he made his experiments were without question too stiff in the first place. The use of inclined links is one way of correcting a bad spring. The average spring maker has another way. He never suggests to his customer the use of inclined links. He first makes a spring according to the blue print, employing the number and thickness of leaves which his experience dictates to be about right. The spring is then sent to the customer to be "tried out," and is usually found to be too soft or too hard. The spring maker is so informed, and he immediately proceeds to apply some more of his experience. After making from two to four applications of this experience, the customer gets a spring which is about right so far as the flexibility is concerned. In our article we indicate a method of getting the desired result at the first crack.

Your correspondent advises that inclined links enable us to use a stiffer spring for the same flexibility, thereby cutting down the stresses under the maximum load. Why use a stiffer spring for the same flexibility when a lighter spring will do the work? It has been our experience that engineers try to make their parts as light as possible. The proper and legitimate way to keep down the effect of excessive stresses is not to make the spring stiffer, that is heavier, but to employ a material with a high enough elastic elongation. If Mr. Laycock prefers to make his springs of inferior material and heavier than necessary, we will not try to rob him of the right.

As to equation (7), which your correspondent characterizes as incomplete and misleading, we regret very much that he has jumped at such a rash conclusion without having read the remaining instalments of the article. Our own application of this equation, with excellent results, to a large number of American springs, and the further fact that it is constantly used for the calculation of springs by the Etablissements Lemoine, for whose spring experience we have a sacred regard, lead us to accept it as the most practical. We have checked the flexibilities of several American springs by means of this formula, and have got more accurate results than the spring maker is able to measure with an ordinary rule graduated in sixty-fourths of DAVID LANDAU. an inch.

ASHER GOLDEN.

Calculation of Compression Space.

Editor Horseless Age:

I am a reader of your paper and have read a number of articles on compression in gasoline motors, but have so far been unable to get just what I want. I would therefore ask for a little information through your columns. I would like to find the necessary compression space of a 4½ bore by 4¾ stroke motor, with valves 2¼ diameter and mechanically operated, to secure a compression 80 pounds per square inch. Is this what is generally used by manufacturers? Kindly supply any of the necessary data that I have not given in order that I may understand it clearly.

P. E. GRACE

[A compression of 80 pounds per square inch gauge is probably somewhat above the average, and 70 pounds would probably be nearer to the mark. The ratio of the necessary compression volume to the piston displacement volume for any given compression is best found from a compression curve, as has been published in The Horse-Less Age repeatedly. From this curve we find that the ratio is 32 per cent. for 80 pounds and 36 per cent. for 70 pounds. The piston displacement volume of your motor is 4.5x4.5x0.785x4.75=75.5 cubic inches. 32 per cent. of this is 24.15 cubic inches and 36 per cent. 27.18 cubic inches.—Ed.]

#### Head Lamp Sizes.

Editor Horseless Age:

In your issue of November 10 on page 537, in reference to the inquiry for suitable size of electric vehicle lamps, we would like to suggest that you advise your inquirer that the 20 c. p. electric lamp will give a much more powerful light on the road than the 37 candle acetylene light, for the reason that the parabolic reflector used with electric lamps will project a great deal more of the light forward than will the saucer shaped reflector used with acetylene gas. We have installed a large number of electric lighting systems on automobiles, and we find that with our 20 c. p. electric headlights we have a much more powerful light than the best of the acetylene type.

> APPLE ELECTRIC COMPANY, V. T. Apple, Mgr.

#### Organization of Henry Motor Car Company.

Following is the full list of officers of the newly organized Henry Motor Car Company, which will take over the business of the Gary Motor Car Company at Muskegon, Mich.: Wm. L. Simonton, president; Chas. F. Latimer, vice president; T. H. DeMange, secretary; Chas. H. Latimer, treasurer; David W. Henry, general manager. Work is being rushed on the new factory which is being erected for the company near the American Electric Fuse Company's factory, and the contracts for the machine tool equipment have been signed. The company will manufacture a \$1,650 car.

### THE FIELD OF COMMERCIAL APPLICATIONS.

Motor Wagons for Italian Army.

It is reported that the general staff of the Italian army, which for some years has been greatly hampered by the scarcity of horses suitable for military service, has decided to make very extensive use of motor trucks in the future. It is said to be planned to ask for an appropriation of 60,-000,000 lire for the purpose. For a beginning bids will be called for on 600 military trucks. No definite specifications have as vet been issued, but it is stated that one light car type with a loading capacity of I to 11/2 tons and one heavy car type with a load capacity of 21/2 tons will be adopted. The operating fuel must be either gasoline, kerosene or alcohol.. The vehicles must be fitted with chain drive, capable of ascending grades of 15 per cent. under full load and carry on board supplies for at least 125 miles. The average speed when loaded must be at least 9.4 miles per hour. After an examination of the bids received, the Ministry of War, before awarding the contracts, will make a trial in order to determine the fuel consumption. It is thought that the invitation for bids will be issued in the very near future.

#### Dispute Over Taxicab Stand.

The New York Taxicab Company last week made an application to Supreme Court Justice Seabury to restrain the New York Taxi-Service Company and the George Rector Company, proprietor of the Café Madrid, from operating a stand in front of that place, claiming that they had a contract with James Churchill, who formerly conducted the café, which still has three and one-half years to run. In the application the annual profits of the stand are estimated at \$20,000, and the loss resulting to the New York Taxicab Company from the revocation of the privilege is estimated at \$70,000. The decision in the case was reserved.

#### Commercial Notes.

Postmaster Eaton, of Duluth, Minn., advocates the purchase of a motor mail wagon for the collection of mails in that city.

The Johnson Auto Company, of Vincennes, Ind., have inaugurated a motor delivery service for local merchants, employing a coupon system.

The operation of the auto line between Thurmont, Md., and Gettysburg, Pa., via Emmittsburg, has been discontinued. A special meeting of the directors and stockholders has been called.

Kenosha, Wis., is the first city in Wisconsin, outside of Milwaukee, to enjoy taxicab service. The Kent Motor Car Company, recently established as an agency and garage, is meeting with success in the ven-

ture and plans to add another cab soon. Kenosha has a population of about 25,000.

The Pacific Manifolding Book Company, San Francisco, Cal., whose salesmen cover the entire State, have decided to provide all of them with Hudson "20" cars, according to a report from San Francisco.

A motor propelled combination hose and chemical wagon is being built for the fire department of Wheeling, W. Va., by the Seagraves Fire Engine Company, of Columbus, Ohio. When accepted it will be stationed in the Atlantic engine house in Wheeling.

W. D. Foil & Co., a livery firm of Mount Pleasant, N. C., have organized a new company to operate a motor service between Mount Pleasant and Concord. A five passenger, 40 horse power car will be used, and two trips will be made per day. The mails, which are now carried by the firm's horse buses, will be carried by the automobiles in future.

#### Grand Prix Prospects.

For the Grand Prix race of the A. C. of France in 1910 the first entries have been received, three cars having been entered by the German Benz firm, two of which are to be driven by Duray and Hemery, respectively, and three by the French Rolland-Pilain firm. The race will be held only if forty-five cars are entered up to November 30. There is at present some talk in Paris that in case the required number of entries should not be received, and the A. C. of France in consequence decide not to hold the race, a syndicate which considers thirty entries entirely sufficient to meet the expenses would conduct the race on the Dieppe circuit in 1910, the Dieppe circuit committee being willing to bear a large proportion of the organizing expenses.

# A. C. of France Protests Against Proposed Taxes.

The Automobile Club of France, in view of the already heavy taxation of motor vehicles of all classes in that country, have adopted resolutions urging the rejection of the proposed new tax on automobiles and the continuation of the present tax; the rejection of the proposed tax on motor boats, and the application of the tax imposed on native owners on automobiles brought into France from other countries after a period of six months; that is, when the owner may be considered a resident of France. Upon the motion of Baron de Zuylen the executive committee decided to investigate the possibility of securing a decrease in the exorbitant duty on gasoline, which is the cause of the high price of 50 centimes per litre in Paris, as compared with 13 centimes in Brussels.

#### Auto Incorporations in Michigan.

Figures given out by the Michigan Secretary of State show the rapid growth of the automobile business in the Wolverine State during the past ten months. From January 1 to November 15, inclusive, thirty-four automobile companies, with a capital of \$15,-423,000, have filed articles of incorporation with the Secretary of State at Lansing. The capital stocks of the companies range from \$8,000 to \$10,000,000. The Packard Motor Car Company, of Detroit, incorporated for \$10,000,000, was the largest concern to file articles this year. In addition to the companies organized for the manufacture of motor vehicles there were fiftyfour companies organized for the production of parts for automobiles. The total capitalization of the parts concerns was \$1,000,000.

#### Private Test of Metz Car.

The Metz Company, of Waltham, Mass, on October 30 put one of their Metz plan cars through a 24 hour endurance run over a five mile course through the streets of Waltham. In 23 hours 45 minutes 460 miles were covered, we are informed, and the car is said to have run throughout the trial with the greatest regularity, the only interruption in the run having been due to a tire puncture, a failure of the gas lamps and the need of carburetor adjustment. During the trial 13½ gallons of gasoline were used and 6½ quarts of oil.

#### Studebaker Branch in Atlanta.

The Studebaker Automobile Company have purchased the interest of G. W. Hansen and his associates in the Georgia Motor Car Company, and papers have been executed for the formation of a Studebaker subsidiary company to conduct a branch in Atlanta, from which will be covered the two Carolinas, Georgia and Florida. Mr. Hansen will continue as manager of the local concern. A new building is being erected at 45 Auburn avenue, in which the company will have a garage and showroom when completed.

#### New Detroit Parts Firm.

The Detroit Steering Wheel and Wind Shield Company was incorporated at Detroit, Mich., a short time ago, with a capital stock of \$100,000, of which \$42,500 has been paid in in cash and \$7,500 in property. The stockholders of the company are: Albert S. Keen, W. H. Hinkle, Howard E. Coffin, Hugh J. Denk, Titus Denk, John A. Galvin and Thaddeus Galvin. The company will manufacture steering wheels, wind shields and other automobile accessories.

### AUTOMOBILE LAW AND LEGAL EVENTS.

### Unfavorable Ruling on Indiana Road Taxation Law.

An important ruling on the road laws of Indiana, which doubtless will retard road building in that State in the future. has just been handed down by the Indiana Supreme Court. This is to the effect that the law authorizing free gravel roads to be paid for by taxation levied on all property in the township, instead of by direct assessment, is unconstitutional. For some years there has been a law permitting fifty residents of a township to petition for a road, to be paid for by the township. After the completion of the roads, bonds have been issued and several millions of dollars worth of these bonds are now outstanding over the State. There is considerable speculation as to what will become of these securities.

The decision was rendered in a case appealed from Hamilton County, where a lower court refused to enjoin the county commissioners from letting the contract for a road to cost \$40,000, which was to be met by a bond issue. The Supreme Court reversed the decision of the lower court. Under the court ruling there is now but one method under which roads can be constructed. This is on petition of a majority of abutting property owners, the cost to be assessed against all property within one mile of the highway thus built. In several counties where roads are under construction, the cost of which was to have been paid by a township tax, the contractors have ceased work fearing there will be no way in which they can collect their money.

#### Renault British Patents Revoked.

Under the new British patents act, which requires foreign inventors to work their British patents to a certain extent if they wish to maintain their validity, a considerable number of patents relating to automobile construction owned by the Renault Brothers firm have recently been revoked. The most important of these is undoubtedly that relating to the cooling system employed in the late models of Renault cars, in which the radiator is located back of the engine and air is drawn through that portion of the radiator from outside the bonnet into the bonnet space and then forced out to the rear by a flywheel fan. Other patents of the Renaults which have been revoked relate to a lubricating system. to the Renault radially meshing change gear system, a spark plug, the conical friction clutch with slits in the cone and inward bent portions to insure gradual engagement, an electric terminal, an arrangement of cam gearing and a shock absorber. The Renault patent covering the direct drive and live rear axle, which is considered to be one of the most valuable automobile patents issued in Great Britain, has not been revoked. The decision in regard to the above patents is subject to appeal, but if no appeal should be made these inventions become public property.

#### New Jersey Law Upheld.

Justice Alfred Reed, of the New Jersey Supreme Court, last week ruled that the Frelinghuysen automobile law of New Jersey is constitutional in all points, in the test case brought by the White Company some time ago. Justice Reed said: "In view of the present need of vigorous enforcement of these laws for the protection of all users of the highways, I am of the opinion that the condition imposed that a man who proposes to use our highways for motoring shall agree to submit himself to the courts of the State into which he comes is legal."

### Atlanta Garage Ordinance to Be Toned Down.

An amendment to the Atlanta, Ga., garage ordinance has been introduced by Alderman F. A. Pittman, with the object of removing some of the present restrictions. The present ordinance forbids the housing of any other kind of business in a building in which a garage is located, but as amended the ordinance simply provides that there shall be no lodge rooms, assembly rooms or sleeping rooms in such a building. It is stated that an inspection recently made by the fire chief and building inspector of Atlanta disclosed the fact that of the approximately twenty-five garages in the city only three were complying with the letter of the ordinance in every respect.

### International Motor Traffic Bill in British Parliament.

The president of the British Board of Trade has introduced in Parliament a bill in connection with the international automobile traffic agreement adopted at Paris recently. The present bill provides for the grant of traveling passes, certificates or authorities that may be of use to residents of the United Kingdom when temporarily taking their cars abroad, or to drivers when proceeding abroad for the purpose of driving motor cars; also, for modifying the provisions of the Motor Car Act of 1903, relating to the registration of motor cars and the licensing of motor car drivers, in the case of motor cars brought temporarily into the United Kingdom by persons resident abroad and intending to make only a temporary stay in the United Kingdom, and of drivers entering the United Kingdom for the purpose of driving any such cars.

#### Legal Notes.

The city council of Greensboro, Ga., have passed an ordinance limiting the speed of automobiles to 8 miles per hour, and to 4 miles at crossings, and requiring cars to carry lighted lamps after dark.

Motorcycles operated in Milwaukee, Wis., must carry a muffler, if an ordinance now before the common council is passed. There are many objections, it being pointed out that the exhaust should be tolerated if only for the protection to pedestrians.

In the petition for the appointment of a receiver for the Auto Motor Car Company, of Cincinnati, Ohio, Reuben S. and John A. Payne and the Payne Motor Company have filed their answer, denying all the allegations made by the plaintiff, and asking for a dismissal of the suit.

Representative Ritter, chairman of the Finance Committee of the Ohio House of Representatives, has prepared the rough draft of a bill which he will ask the General Assembly to enact into a law at the next session which convenes in January, providing for graduation of fees for registering motor cars. Electrics will be charged \$3; gasoline and steamer cars of 20 horse power or less, \$5; cars between 20 and 40 horse power, \$10, and cars over 40 horse power, \$15. Trucks will be charged a uniform rate of \$5.

The Maryland Commission on automobile law and the A. C. of Maryland held a joint meeting on November 17, at which a compromise was effected in respect to license fees, and the bill drawn up by Col. Sherlock F. Swann was endorsed by the club. The club also agreed to a salary of \$3,000 for the Automobile Commissioner to be appointed under the law, instead of the \$2,400 which it formerly had held to be sufficient. The scale of taxes finally agreed upon is as follows: 20 horse power or less, \$6; 20-40 horse power, \$12; above 40 horse power, \$18.

#### French Motor Tourists' Industry.

From the number of triptyques issued by the different national automobile clubs and the number of customs passports given out by the clubs and touring associations, it is concluded that more American and British tourists visited France this year than ever before. Granting that six people were comprised in the average motor party, it is estimated that 24,000 motor car tourists from America and England visited France last year, and, assuming that each party stayed an average of one month, and spent about \$10 per day per person, it is figured that these tourists brought \$7,000,000 into France. These figures were prepared to show the folly of the proposed French tax on foreign motor tourists.

### Comparison of Gasoline and Alcohol Motor Tests.

The United States Geological Survey has just issued a bulletin on "Commercial Deductions from Comparisons of Gasoline and Alcohol Tests on Internal Combustion Engines," by Robert M. Strong. The tests, which were under the technical direction of R. H. Fernald, engineer in charge of the producer-gas section of the technologic branch, were conducted at the fuel testing plant in St. Louis, Mo., and at Norfolk, Va. The tests dealt primarily with gasoline, forming part of the investigation of mineral fuels provided for by acts of Congress. To determine the relative economy and efficiency of gasoline it was compared with denatured alcohol. When the series of tests was started, it was found that it took from one and one and a half to two times as much alcohol as gasoline to produce a given power. With special alcohol engines, entirely suited to the use of alcohol, the latter fuel has been made to do as much work, gallon for gallon, as the gasoline.

On this point the bulletin states: "By using alcohol in an alcohol engine with a high degree of compression (about 180 pounds per square inch above atmospheric pressure-much higher than can be used for gasoline, on account of preignition from the high temperatures produced by compression) the fuel consumption rate in gallons per horse power per hour can be reduced to practically the same as the rate of consumption of gasoline for a gasoline engine of the same size and speed. The indications are that this possible one to one fuel consumption, ratio by volume, for gasoline and alcohol engines, will hold true for any size or speed, if the cylinder dimensions and revolutions per minute of the two engines are the same."

Some of the more important results and conclusions stated in this bulletin are as follows:

The low heating value of completely denatured alcohol will average 10,500 British thermal units per pound, or 71,900 British thermal units per gallon.

The low heating value of 0.71 to 0.73 specific gravity gasoline will average 19,200 British thermal units per pound, or 115,800 British thermal units per gallon.

The low heating value of a pound of alcohol is approximately six-tenths of the low heating value of a pound of gasoline.

A pound of gasoline requires approximately twice the weight of air for complete combustion as a pound of alcohol.

A gasoline engine having a compression pressure of 70 pounds but otherwise as well suited to the economical use of denatured alcohol as gasoline, will, when using alcohol, have an available horse power about 10 per cent. greater.

When the fuels for which they are designed are used to an equal advantage, the maximum available horse power of an alcohol engine having a compression pres-

sure of 180 pounds is about 30 per cent. greater than that of a gasoline engine having a compression pressure of 70 pounds, but of the same size in respect to cylinder diameter, stroke and speed.

Alcohol diluted with water in any proportion, from denatured alcohol, which contains about 10 per cent. of water, to mixtures containing about as much water as denatured alcohol can be used in gasoline and alcohol engines if they are properly equipped and adjusted.

When used in an engine having a constant degree of compression, the amount of pure alcohol required for any given load increases and the maximum available horse power of the engine decreases with a diminution in the percentage of pure alcohol in the diluted alcohol supplied. The rate of increase and decrease respectively is such, however, that the use of 80 per cent. alcohol instead of 90 per cent., or denatured alcohol, has but little effect upon the performance of the engine; so that if 80 per cent. alcohol can be had for 15 per cent. less cost than 90 per cent, alcohol and could be sold without tax when denatured, it would be more economical to use the 80 per cent. alcohol.

The relative hazard involved in the storage and handling of gasoline and denatured alcohol is of particular importance in considering their use as fuels for marine and factory engines and engines to be placed in the basements of office buildings, in coast defense fortifications, or in like places where a general fire would be likely to result from the accidental burning of the fuel stored or carried for immediate supply, or where the forming of explosive or inflammable mixtures of the fuel vapors and air in the immediate vicinity would be hazardous.

In regard to general cleanliness, such as absence of smoke and disagreeable odors, alcohol has many advantages over gasoline or kerosene as a fuel. The exhaust from an alcohol engine is never clouded with a black or grayish smoke, as is the exhaust of a gasoline or kerosene engine when the combustion of the fuel is incomplete, and it is seldom, if ever, clouded with a bluish smoke when a cylinder oil of too low a fire test is used or an excessive amount supplied, as is so often the case with a gasoline engine. The odors of denatured alcohol and the exhaust gases from an alcohol engine are also not likely to be as obnoxious as the odor of gasoline and its products of combustion.

Very few alcohol engines are being used in the United States at the present time, and but little has been done toward making them as adaptable as gasoline engines to the requirements of the various classes of service. Engines for stationary, marine and traction service, automobiles, motor trucks and motor railway cars designed especially to use denatured alcohol have, however, been tried with considerable success.

The price of denatured alcohol is greater than the price of gasoline, and the quantity of denatured alcohol consumed by an alcohol engine as ordinarily constructed and operated is in general relatively greater than the quantity of gasoline consumed by a gasoline engine of the same type. Considerable attention is being given to the development of processes for the manufacture of alcohol from cheap raw materials which are generally available, and it seems reasonable to expect that the price of denatured alcohol will eventually become as low or lower than the price of gasoline, especially if the price of gasoline advances. It also seems reasonable to expect a greater general improvement in alcohol engines than in gasoline engines.

When used as a fuel denatured alcohol is not always so classed as to be exempt from restrictions placed on the use of gasoline by the rules of insurance and transportation companies or city ordinances. The restrictions that are placed on the use of denatured alcohol are, however, never greater than those placed on the use of gasoline. In some places they are such that the use of an alcohol engine is permitted where the use of a gasoline engine is prohibited. For instance, alcohol motor trucks and automobiles are admitted to many of the steamer piers in New York that are not open to gasoline machines.

When the restrictions placed upon the use of denatured alcohol are less than those placed on the use of gasoline or where safety and cleanliness are important requisites, the advantages to be gained by the use of alcohol engines in place of gasoline engines may be such as to overbalance a considerable increase in fuel expense, especially if the cost of a fuel is but a small portion of the total expense involved, as is often the case. Denatured alcohol will, however, probably not be used for power purposes to any great extent until its price and the price of gasoline becomes equal, and the equality of gasoline and alcohol engines in respect to ability to service required and quantity of fuel consumed per brake horse power, which has been demonstrated to be possible, becomes more generally realized.

A further general development in the design and construction of engines that use kerosene, or cheaper distillates, and the crude petroleums may be reasonably expected and may delay the extensive use of denatured alcohol for some time to come, but as yet comparatively few data pertaining to this phase of the general investigation are available.

Invitations will be sent out to 2,200 carriage dealers, as well as to a great number of automobile agents, to attend the Grand Central Palace Automobile Show in New York, which opens on New Year's eve, as guests of the management.

# The Automobile Industry Affecting Wages.

The influence of the automobile builders in raising the general standard of wages in the machinery and allied industries has been brought home to a great many employers of labor during the process of increasing working forces which is now going on. The impulse which sends the labor market upward originates largely with the great plants that employ a high percentage of skilled labor. They absorb the surplus idle men and then seek for men wherever they are available. Offers of higher pay in such special cases exert an irresistible influence toward a general advance. The automobile industry has come to be the greatest factor of all in this connection; it is felt the more because the plants have increased enormously during a period when most lines of manufacture were experiencing poor business and were compelled to lay off large portions of their forces

'The great movement of skilled labor is toward the Middle West. In the East there is general complaint that the Western inducements offered employees are so attractive that they are migrating by the hundred. Young men especially show eagerness to embrace the opportunities opened to them. There is difficulty in retaining the services of apprentices when they graduate into journeymen; they are leaving the machine tool builders in almost disheartening numbers. In some cases the higher prices are met, in order that shop organizations may not be too seriously disturbed. In others the attempt is held to be The successful automobile manufacturer has achieved his position in the trade largely through the excellence of his product. This he must maintain, and it can be accomplished only by keeping up a high standard of workmanship. He must have the men. If other employers meet his prices he must raise the figure. Therefore there is good reason in many instances for not trying to keep men who have been approached with offers of more liberal wages than their employers can afford to establish. The automobile people who are expanding the most rapidly have probably made very large profits and can afford to pay extravagant wages in order to retain their reputation as manufacturers and the earnings which go with them.

This condition, it is expected, will tend toward higher prices for the product of the machine shops. The machine tool industry is now suffering from the combination of a scarcity of help and higher prices for labor. There seems to be no alleviation of the condition except in increased concentration or the development of specialists, by the training of unskilled men to do some one work well, and a combined effort, through apprentice systems and industrial schools, to provide for a future in which good men will be available in numbers better proportioned to the demand.

The Bureau of Statistics of Massachusetts

has just published figures which illustrate the different wage conditions as they exist in the industries, two of the headings being "automobiles" and "foundry and machine shop products." Unfortunately the figures are for the dull year of 1908, which was not a happy one, and make a legitimate comparison impossible. The automobile business was excellent, while the foundry and machine industries were dull. But, on the other hand, the automobile people were able to get the best of men at wages below the present market, and while foundry and machine shop help is probably as well paid in Massachusetts as anywhere, taking the average, wages in the automobile plants of the Middle West are higher than in those of the New England States. Other corrections may have to be taken into consideration. But the fact that the average yearly wage paid by the automobile industry in Massachusetts was 25 per cent, greater than in the machine shops and foundries, as a whole, is significant. Thirteen automobile factories, with \$3,216,000 of capital devoted to production, paid \$1,223,000 in wages to an average payroll of 1,627 persons, making an average annual earning of \$752.11. The value of the product was \$5,443,000, and that of stock and materials consumed was \$1,526,000. Thus the net profits, above labor and material, was \$2,693,000, or 49 per cent. The percentage of wages to capital was 38. The manufacturers of foundry and machine shop products to the number of 519, with capital of \$60,525,000 devoted to production, paid \$18,600,000 in wages to an average payroll of 31,112 persons, making an average annual wage of \$601. The value of product was \$52,208,000; that of stock and material \$20,791,000. The net profit above labor and materials (not including overhead expenses, of course) was \$16,716,000, or 30 per cent. The percentage of wages to capital was 30. A comparison of these figures affords good reasons why the automobile industry can afford to pay high wages; in fact, why it has to pay them, if they are required in order to get the best labor possible. If the machine tool builder and others resent the presence of this new competitor for labor the consolation must always be kept in mind that the automobile is the best customer that has made its appearance in years.—Iron Age.

# A. O. Smith Company Buys More Land.

An additional 15.5 acres has been purchased by the A. O. Smith Company, of Milwaukee, Wis.. said to be the largest manufacturers of pressed steel frames in the world. The tract adjoins the site of the new factory, to be ready for occupancy on January 1. President A. O. Smith said that the additional land, which cost \$45.000, will be used for future extensions and additions. An idea of the size of the new plant may be gained from these dimensions: Main factory, 287x1,025 feet; power house, 70x400 feet; office, two stories, 60x148 feet.

#### Recommendation of American Manufacturers to International Conference.

The Automobile Club of America, as the officially recognized representative of America in the International Conference of Automobile Clubs of all Nations, which meets at Paris on December 7, to decide on the international racing formula for 1910, has forwarded to its delegate in Paris, William S. Hogan, the recommendations made by the Manufacturers' Contest Association, representing the consensus of opinion of the American automobile manufacturers as a basis for international automobile competitions for 1910.

Although the Automobile Club of America has for a number of years past annually requested the American manufacturers to define their attitude on these matters, in order that America might be represented in the International Conference. this is the first time in the history of the sport that a definite exposition of the attitude of the majority of the American manufacturers has been put forward.

The adoption of a classification by piston displacement and minimum weight with a "stock car limitation" is the result of the past experience of the American manufacturers and especially of the past year of racing and contests in America, when it was well tried out. It is a logical and advantageous classification for automobile competition, both from the standpoint of the manufacturer and the intending purchaser, and is recommended for international adoption. The recommendations are:

First—That only bona fide stock cars or stock chasses be eligible for entry in international events.

Second—That cars entered in international events be classified as follows:

Open to any chassis which is in accordance with the definition of a "stock chassis" and in accordance with the following table of piston displacement and minimum chassis weights:

	Piston	Minimum
	Displacement in	Weight
Division.	Cubic Inches.	in Pounds.
ī	160 and under	1,200
2	161 to 230	1.500
3	231 to 300	1,800
4	301 to 450	2,100
5	451 to 600	2,400
6	for and over	2 600

No car shall compete in any class above that to which its weight entitles it.

This recommendation is along the lines which will govern automobile competition in America for the coming year, with the possible exception of the larger classes. As the American manufacturer will no doubt build "stock cars" up to the limit of each of these piston displacement classes, should a similar classification be adopted internationally it would enable foreign and American cars to compete on even terms and should serve to stimulate international competitions. It is known that some of the French makers favor the abolition of all restrictions.

### NOTES OF THE INDUSTRY AND THE SPORT.

The Federal Rubber Company, of Milwaukee, Wis., has established a Southwestern branch at 102 Pryor street, Atlanta, Ga.

The winning car in the recent Los Angeles-Phœnix race, which was fully reported in our last week's issue, was equipped with Goodyear tires and rims.

The Bettendorf Axle Company, of Bettendorf, Ia., have purchased the factory and site of the Meteor Motor Car Company which was recently badly damaged by fire.

The Toledo Motor Company, of Toledo, Ohio, has changed its name to the Willys-Overland Company, by amended articles recently filed with the Secretary of State.

The American Oxy-Acetylene Welding and Cutting Company are establishing a plant at 2306 Olive street, St. Louis, Mo., where demonstrations of the process will be given after November 23.

The Michelin Tire Company have opened a branch in Kansas City, Mo., at 1926 Grand avenue, where a full stock of tires, sundries and accessories will be carried. The branch is in charge of Wayne Murray.

Operations on the new building under construction for the DeSchaum-Hornell Motor Company, at Hornell, N. Y., have been suspended owing to differences between the company and the contractors.

The Grabowsky Power Wagon Company, Detroit, Mich., are building an addition to their present factory building. They are also looking about for a suitable factory building in addition to the one they are now occupying.

The Buffalo Automobile Trade Association, at a meeting held at the Iroquois on November 16, decided to hold their annual show in Convention Hall during the week of March 7. Wm. C. Jaynes, president of the association, presided.

In an advertisement of the Hartford Suspension Company, in our last week's issue, it was erroneously stated that "the leading automobile manufacturers are now regularly equipping their cars with the Truffault-Hartford with extra charge." It should, of course, have read "without extra charge."

One of the taxicab companies operating in Chicago, in a communication to the board of managers of the Chicago A. C., offers to contribute \$100 to a fund to be used for the erection and maintenance of permanent steel gates at the approaches of swing bridges, in case the city of Chicago refuses to install them.

The United States Motor Truck Company, of Cincinnati, Ohio, have closed a lease for the old manufacturing plant of the Ahrens Fire Engine Company at 214-216 Webster street. The buildings contain 40,000 square feet of floor space and the lease runs for four years at a rental of \$7,000 for the term. The company expect

to complete their first ten motor trucks within the next thirty days.

The Schaefer Company, of Berlin, Wis., foundrymen and gasoline motor manufacturers, are doubling the capacity of their plant by additions costing \$15,000, with the intention of entering the automobile truck manufacturing field. The first truck is about completed.

The Lagerquist Carriage Company, 209 West Grand avenue, Des Moines, Ia., have begun the construction of a three story vitrified brick automobile and carriage factory. Mr. Lagerquist has been manufacturing delivery automobiles, known as the "Hawkeye," for several months.

The Weyher Manufacturing Company, Whitewater, Wis., are placing on the market a 1,000 pound water cooled, two cylinder delivery wagon fitted with the improved Waite friction drive. The output of the factory will be handled by the Car Makers' Selling Company, 1256 Michigan avenue, Chicago, Ill.

The Indiana Automobile College has been organized in Indianapolis, for the purpose of conducting an automobile school of instruction. It is incorporated with an authorized capitalization of \$5,000, with C. S. Gant, Jessie G. Gant, Ozoro Belle Gant, Charles C. Pettijohn, Samuel Glick and Nellie A. Glick.

The Maxwell-Briscoe Motor Company, of Tarrytown, N. Y., announce an increase in the price of their 12 horse power runabout from \$550 to \$600, and on their four cylinder, 22 horse power runabout from \$850 to \$900. There will be no change in the price of their 30 horse power, four cylinder car.

The Gardner Engine Starter Company, of Chicago, Ill., manufacture an attachment for Ford Model T rear axles, to reinforce the axle, taking the place of a brace rod. It is claimed to seal up the differential housing so that grease will not leak out, and to prevent vibration and chattering when the car is being driven on the low gear.

State Highway Commissioner J. C. Wonders, of Ohio, will shortly issue a complete road map of the State by counties, which will be a great boon to autoists. The map will show every turn in the road, bridge, railroad crossing, hill, etc. It will be offered in book form for autoists to carry in the receptacles in their cars, and may be published in color later.

Mayor Bookwalter and other city officials of Indianapolis witnessed a test with a motor fire engine, made by the Howe Engine Company, on November 17. The engine was equipped with a six cylinder motor, which, in addition to driving the car, was used for driving a six cylinder pump.

The company is now planning to build a machine equipped with two four cylinder motors, operating two pumps, especially designed for metropolitan service.

#### Club Notes.

A movement is on foot for organizing an automobile club in Dayton, Ohio. Most of the dealers of the city are taking an active interest in the plan.

The Board of Managers of the Chicago A. C. are considering a plan to enlarge the quarters of the club, and may secure two floors of the building next to the club house in Plymouth Court.

The Automobile Club of America opened the entertainment season last night (Tuesday), with an address on "Experiences in Hunting Big Game in South Africa," by Bayard Dominick, Jr.

The A. C. of Hartford, Conn., has received a large wall map of the State of Connecticut from C. D. Rice, chairman of the committee on good roads and sign-boards, and the assistant secretary of the club is preparing a chart giving the road distance between any two of 275 towns in the State.

At the annual meeting of the Chicago Motor Club last week a plan to establish a special automobile track in that vicinity was outlined by David Beecroft, chairman of the technical committee. It was stated that the scheme would meet the co-operation of the Chicago and Northwestern Railroad and the Chicago and Northwestern electric line.

The Auto Drivers' Protective Association has been organized at Chicago, Ill., with a charter membership of 115, to make "war on reckless drivers, rich or poor, small or great." The organizing meeting was held in the office of Walter W. Wilcox, 107 Washington street, and the following officers were elected: Walter W. Wilcox, president; Taylor A. Snow and F. McH. Kitching, vice presidents; Neil Gronberg, secretary; Roy O. Gilbert, treasurer, and E. M. Seymour, general counsel.

Racing Notes.

Barney Oldfield made a new mile record for a one mile track of 53 3.5s. on the San Antonio, Tex. track on November 15.

The judges of the recent Los Angeles-Phænix race, after reviewing the rules and precedents governing the contest, came to the conclusion that they were only to decide upon the winner of the race, taking no official action upon the claims of the contestants for second and third places. The award of second place to the Isotta car, as mentioned in the addition to our report in last week's issue, was therefore withdrawn, and the judges state that in their private opinion the Columbia deserved being awarded second place and the Isotta should be disqualified.

The Flag to Flag Endurance Contest, from Denver to Mexico City, which was to have been held on November 22, has been declared off for this year, but may be held in June or July of next year during the centennial celebration at the Mexican capital.

#### Trade Personals.

LEO CHAPMAN has been appointed sales manager of the Glide Motor Company, of St. Louis.

CHARLES WAUGH, a prominent carriage and automobile dealer of Boston, died at his home in Cambridge, on November 19, aged sixty years.

A. B. CORDNER, formerly of the A. B. Cordner Company, of New York, has become manager of the Rapid Motor Vehicle Company sales branch in this city, which will be opened at Sixty-fourth street and

P. L. Hussey has resigned from the firm of Brandenburg & Co., Chicago, Ill., the resignation to take effect December 1, to join the new F. Z. H. Parts Company, 1256 Michigan avenue, composed of Messrs. Fulton, Zinke, and Hussey.

BARON VON GIENANTH, the American reppresentative of the Benz Company, has been made an honorary member of the Atlanta Chamber of Commerce, in recognition of his co-operation in the conduct of the New York-Atlanta Good Roads Tour.

ERNEST A. Moross has withdrawn his resignation as director of contests of the Indianapolis Motor Speedway, which was to have become effective on November 15. The action was taken at the earnest request of the management. Plans are now under way for a race meet on the course on December 11. If this can be held, there will be events for all of the stock chassis classes under the A. A. A. rules and there will also be a 1,000 mile race.

#### New Incorporations.

The Delaware Garage Company, Wilmington, Del.-Capital stock, \$100,000.

The Ewing Automobile Company, Geneva, Ohio, has increased its capital stock from \$75,000 to \$300,000.

The Stuyvesant Motor Company, Cleveland, Ohio.-Capital stock, \$200,000. Incorporators, F. E. Stiverson and others.

The Henry Motor Car Company, Muskegon, Mich.—Capital stock, \$200,000. Incorporators, Wm. L. Simonton, David W. Henry, John Q. Ross.

The Automobile Insurance Company of America, Indianapolis, Ind.—Capital stock, \$1,000,000. Incorporators, D. M. Parry, John McCardle and others.

The Casa Loma Garage, Redlands, Cal.-Capital stock, \$25,000. Incorporators, C. A. Tripp, W. F. Stutt, Robert Leith, Robert Barker and Thomas Younghusband.

The Automobile Advertising Company, Spokane, Wash.—Capital stock, \$20,000. Incorporators, G. C. Stevens, W. S. Coey, H.

L. Tibbetts, A. Witmans and C. N. Hornibrook.

The Abbott Motor Car Company, Detroit, Mich.—Capital stock, \$300,000. corporators, Chas. S. Abbott, John Phillips, John G. Utz, A. T. O'Connor and others.

The Twin City Taxicab Company, Minneapolis, Minn.-Capital stock, \$600,000. Incorporators, A. S. Elford, W. S. Vent, of St. Paul, and W. J. Prowell, of New York.

The Rauch & Lang Carriage Company, Cleveland, Ohio, have increased their capital stock from \$250,000 to \$1,000,000. The additional capital is designed to cover the cost of enlargements of the firm's plant.

The Horseless Age Company, 11 Murray street, New York.—Capital stock, \$100,-000. Incorporators, Fred J. Wagner. New Rochelle, N. Y.; Chas. B. Ames, Metuchen, N. J., and Samuel B. Stevens, Rome, N. Y.

Charles D. Quier, a vehicle top manufacturer, of 1323 West Eleventh street, Kansas City, Mo., died from apoplexy on November 8, aged fifty-nine years. He was a native of Allentown, Pa.

#### Trade Literature Received.

Chelsea Clock Co., Boston, Mass.—Descriptive catalogue of "Chelsea" clocks.

D. H. Lawrence Co., Sterling, Ill.-Catalogue describing the Pitner automobile pump.

The Standard Gauge Co., Foxboro, Folder entitled "Something About Gauges."

Pfanstiehl Electrical Laboratory, North Chicago, Ill.-Folder on Pfanstiehl magnetos and coils.

Packard Motor Car Co., Detroit, Mich.-Folder relating to applications of the Packard truck.

Frank Mossberg Co., Attleboro, Mass.—Catalogue of monkey wrenches and the Auto Cle wrench. Liggett Spring & Axle Co., Pittsburg, Pa.-Cata-

logue of automobile springs, showing the different Detroit Steel Products Co., Detroit, Mich .-

Pamphlet on "Fenestra" window sash for garages and factories.

Star Brass Works, Chicago, Ill.-Folder on the practical use of the Star vehicle washer and descriptive of the Binks compound air pump.

Electric Ignition Co., Ltd., Sampson North, Birmingham, England.—Catalogue Road trating the Hall system of dual ignition, including magneto, spark plugs and waterproof coils.

The G & J Tire Co., Indianapolis, Ind.— Pamphlet, "An Ounce of Prevention That Is Worth a Pound of Cure," on the care and repair Also a catalogue of "Tires and Sunof tires. dries."

Continental Caoutchouc Co., New York .- Consumers' prices on Continental tires and demountable rims, showing the equipment required for mounting and removing demountable rims and ready flated tires.

#### New Agencies.

CHICAGO, ILL.-Louis Geyler, Mercer. DENVER, COL .- W. N. Barnett, Alco. LA GRANDE, ORE.—L. C. Smith, Ford. HAVANA, CUBA.—John L. Stowers, Mora. ST. LOUIS, MO.—W. Von Steiger, Moline. OLYMPIA, WASH .- Geo. S. Duby, Cadillac. PORTLAND, ORE .- Dr. G. E. Watts, Knox. NEW ORLEANS, LA.-L. Seve, Rider-Lewis. DENVER, COL.—Joe McDuffee, Woods electric. BELLINGHAM, WASH.—A. M. Lane, Cadillac. EVERETT, WASH .- Everett Automobile Co.,

ANACORTES, WASH,-Knapp & Ronnerberger, Ford.

SPOKANE, WASH .- The Standard Automobile

INDIANAPOLIS, IND .- The Finch & Freeman

Co., Auto Row, Rider-Lewis, De Tamble, Autom and Richmond.

RUGBY, N. DAK .- J. Grant, Jackson. MEDFORD, ORE.—Dr. Gale, Locomobile. ST. LOUIS, MO.—W. von Stieger, Moline. PORTLAND, ORE.-G. A. Wotton, Rambier. GRANVILLE, N. DAK .- A. P. Simonson, Ford PORTLAND, ORE.—Harold S. Manion, Parry. HOUSTON, TEX.—J. E. Siegmund, Hupmobile. ATLANTA, GA.-William H. George, Locomo-

STARKWEATHER, N. DAK .- Dr. Fawcett,

FORSYTH, GA.—Georgia Automobile Co., Ohio.

PORTLAND, ME .- The Mank-Stuart Co., Cadillac.

PORTLAND, ME .- Portland Motor Mart, In-

OMAHA, NEB .-- The Wallace Automobile Co. Stearns.

FRANKFORT, IND. — Kernodle & Jones.

KANSAS CITY, MO.-Lester W. Lease, Franklin.

TOLEDO. OHIO.-The Wood-Kessler Co., Black Crow.

INDIANAPOLIS, IND.—Peck Motor Co., Auto Row, Cadillac.

ATLANTA, GA .- Southern Farm and Toll Co.,

FOLEY, MINN .- The Foley Hardware Co., Studebaker.

SAN FRANCISCO, CAL-John A. Bunting.

Jr., Franklin.
PITTSBURG, PA.—The Keystone Automobile Co., Overland.

ST. LOUIS, MO .- Messrs. Brown Brothers. Detroit Electric.

COLUMBUS, OHIO .- Dr. R, C. Wescott, Regal for central Ohio.

ATLANTA, GA.—McConnell-Kurfees, 30 North Pryor street, Moon.

COLUMBUS, OHIO. The Franklin Cycle and Supply Co., Demot.

INDIANAPOLIS, IND .- State Automobile Co., Auto Row, Oakland.
LOUISVILLE, KY.—The Banks Motor Car Co.

Second street, Ford. MILWAUKEE, WIS .-- R. P. Pennock, 1058

Eight street, Franklin. NIAGARA FALLS, N. Y .- Swick & Pattison,

Great Western "30." SCRANTON, PA .- Motor Co., Ltd. 231 Wyo-

ming avenue, Premier. RUGBY, N. DAK.-Sannan Brothers & Scott,

Maxwell and Hupmobile. DODGEVILLE, WIS .- J. H. Ford, EMP and other Studebaker lines.

BOSTON, MASS .- S. M. Supplies (for eastern Massachusetts).

PENN'S GROVE, N. J.-Geo. W. B. Mitchell (for Salem County).

LYNN, MASS .- E. R. Whitten, The

ers" for Boston and vicinity.

INDIANAPOLIS, IND.—The Van Comware and Iron Co., Randolph.

COLUMBUS, OHIO.—The Love Gan

North High street, White steamer,
PORTLAND, ME. — Stoughton-Politics Co.,

Oldsmobile, Oakland and Maxwell.
ST. LOUIS, MO.—The Heier-Roys

bile Co., Cartercar, Apperson and De Tan

TACOMA, WASH.—The Tacoma Co., Oakland, for southwestern Wash MILWAUKEE, WIS .- The Bland-Mi Co. has changed its name to the Prophilic Anto

mobile Co. KANSAS CITY, MO .- McGee-Hund

Car Co., Fiat, Mora, Crawford, Stodd Wilcox, Courier and Fritsche electric.

Foreign Events. December 5-19—Reliability Trial Cars, under direction of L'Auto, Paris

January 28 to February 5—Automobile bition at Waverley Market, Edinburgh, S. under direction of Scottish Motor Trade As

# The Horseless Age

First Automobile Journal in the English Language

**VOLUME XXIV** 

NEW YORK, DECEMBER 1, 1909

NUMBER 22

### European Trackless Trolley Vehicles and Installations.

By Ernst Valentin.

Attention has repeatedly been called to the advantages of the electric system for the propulsion of road vehicles, as compared with the gasoline and steam systems; but it has generally also been pointed out that a satisfactory solution of the question of supplying the electric motors with the necessary current had not yet been found. If storage batteries are carried along on the vehicle the radius of action is limited to about 60 miles, and the profitableness of the service is doubtful on account of the heavy weights to be carried and the short life of the battery. On the other hand, the generation of the necessary current on the car itself requires the installation of a special gasoline motor and electric generator, which complicates the assembly of the chassis and introduces a number of difficulties which it has so far been impossible to entirely overcome.

Attempts have therefore been made to

supply the necessary operating current to the cars in a different manner, and these attempts have met with such favorable results that an investigation of such services in respect to construction and profitableness seems timely. This characteristic feature of these systems consists in the installation of an overhead conducting wire along the route to be covered, similar to the overhead wires of electric street railways. The system differs from the ordinary trolley system, however, in that no special rails are laid in the streets, the current from the feed wire being led to cars running on rubber or iron tired wheels. Such lines are, therefore, logically referred to as trackless trolley lines.

In the following discussion the two systems which have been in successful practical operation in Germany and Austria, respectively, for some years, are taken as representative types. These systems are being exploited, respectively, by the Gesellschaft für Gleislose Bahnen, Max Schiemann & Co., in Wurzen, Saxony, and the Oesterreichische Daimler Motoren-Gesellschaft, in Vienna-Neustadt, which latter exploits the Mercedes Electrique-Stoll system. Other systems have been tried out in the United States, in Italy (on the Pescara-Castellamare route), in Germany (from Oberschöneweide, near Berlin, to Johannistal), etc.

It is unnecessary here to enter into the construction of the poles or brackets which are secured to the adjacent buildings for carrying the conductor wires, as the arrangement is essentially the same as with street railways. It should be pointed out, however, that in the case of trackless trolley lines, two trolley wires are always required, as the rails which are generally used for the return circuit in street railway practice are here absent. The trolley wires are installed at



FIG. I.—INDUSTRIAL TRACKLESS TROLLEY LINE AT WURZEN, SAXONY,



FIG. 2.—TRACKLESS TROLLEY LINE ON DAIMLER-STOLL SYSTEM.

a height of 17 to 20 feet above the ground. The cars are generally operated with continuous current at from 500 to 550 volts.

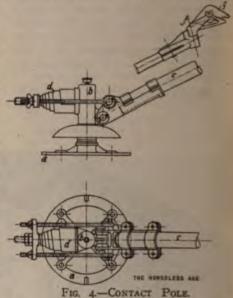
The method of fastening the wires to the poles differs in the Schiemann and Daimler systems, owing to the fact that in the Schiemann system the current is taken from the wires through spring supported trolley poles from below, and in the Daimler-Stoll system through loaded rollers from above, as may be seen from the general views of these installations, Figs. I and 2. In the case of the Schiemann system Fig. 3 illustrates the design of the double insulators necessitated by the double trolley line. The wires themselves are secured to clamps fastened to

the insulating plugs, in such a manner that the current collectors make contact with the wires from below. In the design of the current collecting mechanism it must, of course, be taken into account that the vehicles must be free to run over the entire width of the road. Otherwise difficulties would ensue whenever horse vehicles are met or overtaken. 'This rather difficult problem has been solved by Schiemann by the adoption of rather long trolley poles with rotatable driving contacts.

The design itself is shown in Fig. 4. The base a is secured to the roof of the car and carries the rotary housing b. The contact pole c, which is from 17 to 20 feet long, is pivoted to the housing b

and is pressed by the strong spiral spring d upward against the conductor wires. To the upper end of the contact pole : is secured a forked casting f, which has hinged to it the rotatable sliding contact The lower part of this contact is filled with grease in order to save the trolley wires as much as possible, and the contact is of unusual length in order to operate without arcing. Whenever two of the trolley vehicles meet the driver of one must take his contact pole from the wires until the other one has passed. The same applies in the case where an omnibus, for instance, is overtaking a freight train ahead of it.

The current collector of the Daimler Motor Company is illustrated in Fig. 3. As already pointed out, it presses on the trolley wires from above. In order to insure very easy motion the current collectors themselves are developed as rollers, and there are two rollers to each pole, in order to insure sparkless operation. In order to properly guide the rollers they are limited below by means of projecting metal parts. A suspended



weight is carried at the middle of the contact carriage, and to the rod of this weight, at about one-tenth the distance from the top, is secured the trolley cable. The cable containing the two wires leads from there down to the roof of the car, where it taken up by a short pole. In order to always provide the tension for the cable necessary to reliable operation its end is fastened to a drum provided with a spring mechanism which constantly tends to wind it up. This cable drum, together with its short pole, can be easily removed, and whenever two of the vehicles meet they simply exchange their complete poles and cable drums.

If now we pass to the operating equipment proper, we may distinguish between two, or, better, three, classes of vehicle, namely, omnibuses and trucks which are themselves equipped with motors, and

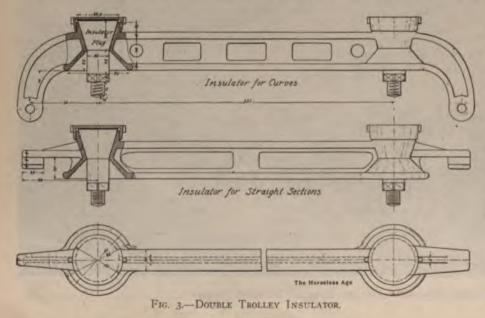




Fig. 9.—Mercedes-Stoll Trolley.

besides, goods trains for heavy transportation. The latter consists, as a rule, of a tractor and a series of trailer vehicles.

Fig. 6 shows the tractor of the Wurzen industrial motor line road train illustrated in Fig. 1. The tractor is arranged in accordance with mining locomotive

practice, in that it may be run equally well in either direction. The driver's cab is in the middle, and can be entirely enclosed. The complete drawings of this tractor, shown in Fig. 7, show that all

four wheels are driven by means of two separate electric motors, so that the total weight of about 6 metric tons of the tractor is available for traction purposes, which permits of hauling several fully loaded trailers. If we assume that each wheel carries a load of 11/2 metric tons and the tires have a width of 8 inches, we find that the wheel pressure is about 400 pounds per inch width.

Both of the axles are mounted on a rotatable truck each, on which the upper frame is carried on special rollers. The running gear is supported on long leaf springs, while the electric motors are provided with two spiral bumper springs

each. The motors develop each about 24 horse power, and are wound for continuous current of 550 volts. The drive from the motors to the axles is through toothed gearing. No differential gear is employed, but the wheels are driven from the axles through ratchet devices or one-way

clutches. The vehicle is steered by rotating the two trucks simultaneously by means of a threaded spindle, which is operated by means of a hand wheel located at one side of the driver's cab. At the same side of the cab



Fig. 6.—Schiemann Tractor.

is arranged the controller for the electric motors. The controller affords nine different speeds, four with the two motors in series and five with the motors in parallel. For the three main positions—"ahead," "stop," and "backward"—a special reversing switch is provided.

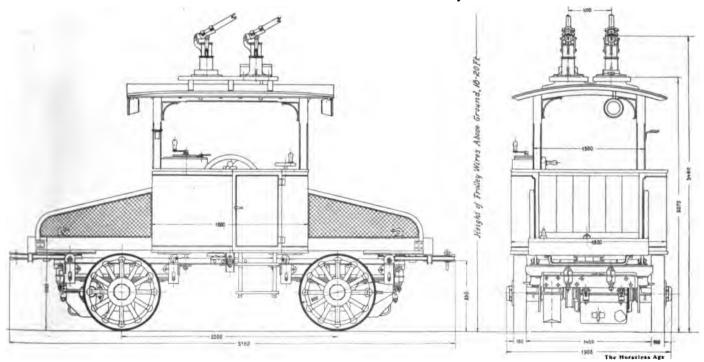


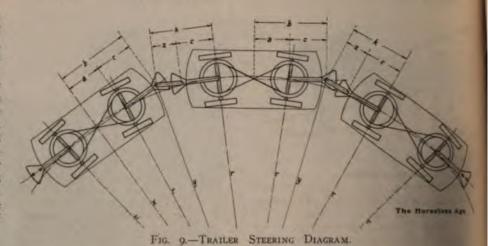
FIG. 7.—SIDE AND END ELEVATION OF SCHIEMANN ELECTRIC TRACTOR.

The design of the trailers is shown in Fig. 8. The most interesting feature of these trailers is the method of steering, which consists in turning the two trucks which carry the main frame of oak wood. The steering is effected automatically, since the tractor is connected with the first of the trailers in a special way, and each of the trailers is coupled to the following one. These steering methods of motor road trains have been very thoroughly investigated, among others by W. A. Th. Müller in his book on "Der Automobilzug," page 25 and following. As may be seen from Fig. g, the theoretical conditions which must be met in order that the separate vehicles of the Schiemann train may track are that

$$r^{2} = a^{2} + x^{2}$$
  
 $y^{2} = b^{2} + x^{2}$ ;  $y^{2} = r^{2} + k^{2}$   
 $a^{3} + x^{2} + k^{2} = b^{3} + x^{2}$   
 $k^{2} = b^{3} - a^{3}$ ,  $k = \sqrt{b^{2} - a^{2}}$   
 $Z = k - (b - a)$ 

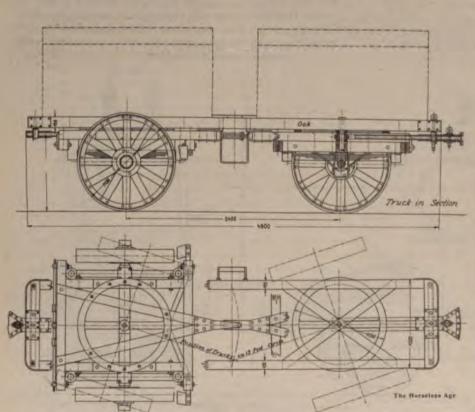
In the above r represents the turning radius; a, the distance from the centre of the king bolt of the trucks to the centre of the vehicle; b, the distance of the coupling point to the true centre c; b-a, the distance of the coupling point from the centre of the king bolt; k, the distance of the coupling point from the king bolt of the following trailer; x, the distance of the central point of the vehicle from the centre of the turning circle; y, the distance of the coupling point from the centre of the turning circle; and x, the length of the coupling piece itself or the distance between the two coupling points.

The following illustrations show the run-



ning gear of a vehicle employed in connection with the Mercedes Electrique-Stoll trackless trolley system, as exploited by the Austrian Daimler Motor Company. use of hub motors gives the chassis an extraordinarily simple appearance. The chassis frame is entirely devoid of mechanism, except for the steering post and electric controller at the extreme front. The frame is carried through long semi-elliptic springs in the front axle, which is provided with the usual pivoted steering knuckle, and also on the rear axle, whose wheels contain the driving motor. The weight on one of these chasses complete is only about 3,740 pounds. Fig. 10 clearly shows the rear driving wheels, Attention is called to the fastening of the springs to the frame-by means of drop forged shackles; to the large brake drum and the operating links for the two expand-

ing brakes. The motor itself is shown in Fig. 12, Special attention is called to the arrangement of the commutator brushes is a vertical plane. This arrangement is claimed to obviate the possibility of the brushes being thrown out of contact with the commutator by the rather severe jarring in connection with solid rubber tires, as would be likely to occur with the usual arrangement of the brushes. The motors have a normal output of an horse power and may be overloaded 100 per cent, for short periods. The energy consumption per ton-kilometre is given as fifty-four watt hours in summer and seventy watt hours in winter. Fig. 10 shows the construction of the forward part of the chassis more in detail. At the right of the driver is arranged the steering wheal, through which a cross steering bar is actu-



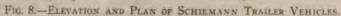




FIG. 10.—FRONT VIEW OF MERCEDES-STRU-TRUCK.



FIG. 13.—MERCEDES-STOLL REAR CONSTRUC-TION, SHOWING LARGE BRAKES, DOUBLE SOLID TIRES AND BRAKE CONNECTIONS.

FIG. 11.—EXCHANGING TROLLEY CABLES.

ated. The reason for the adoption of a cross steering rod was that it was considered important to place the steering gear as far forward as possible, to leave as much as possible of the frame free for loading purposes. This illustration shows the cable drum very plainly, which holds the cable. coming from a lateral roll, constantly taut. About 30 to 35 feet of cable can be rolled up and unrolled, whereby the vehicles are permitted to pass or overtake other vehicles and run over the whole width of the road. Fig. 11 illustrates the manner in which two vehicles of a single trolley installation exchange their current collectors on meeting each other. This is effected by interchanging the two plug contacts leading to the cable drum. The vehicles of this line are still provided with the formerly customary arrangement of hub motors in the front wheels. At present the Mercedes front wheel drive is only employed when all four wheels are driven, as in the case of road

The controller is operated with the left hand, the same as on street cars. In order to protect the forward mechanism, and especially the resistances against dust, the pressed steel frame of the vehicle frame is provided in front with a special sheet metal housing.

#### The "Dynatak."

Prof. N. Monroe Hopkins, of the George Washington University, Washington, D. C., has invented an instrument styled the "Dynatak," which is designed to furnish a continuous indication of the performance of an internal combustion in several respects.

The device consists of a special spark plug for use in each cylinder, with which is incorporated a thermo-electric couple of peculiar construction. This thermo couple, when exposed to the explosion within the motor cylinder, furnishes an electrical pressure



Fig. 12.—MERCEDES MOTOR.

which is in proportion to the temperature existing within the cylinder, and this pressure is arranged to indicate upon a suitable electrical instrument within view of the operator.

Cylinder temperature increases with the rate of fuel combustion within the cylinder, and hence the indications of the instrument represent to a certain extent the output of the cylinder when speed is also taken into consideration. The connections are so made that the temperature in any particular cylinder may be separately indicated, and by putting the thermo couples in series the reading represents the combined temperatures of all the cylinders, or, to a certain extent, the torque of the motor. When a tachometer reading of the motor is simultaneously taken the product of this with the electrical reading gives an idea of the motor output. If one cylinder is missing the temperature of the thermo couple will be very low, and the low indication given when this cylinder is tested will indicate the condition of faulty ignition.

Cylinder temperature will also depend

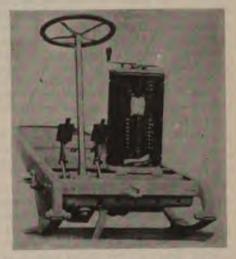


FIG. 14.—FRONT OF CAR WITH CONTROLLER.

upon the correctness of the mixture, and thus the indication of the instrument may be used as an index in perfecting the carburetor adjustment, the mixture proportions being properly so arranged that the temperature indication shall be a maximum for any given throttle opening.

The tachometer used in connection with this instrument is a small engine driven magneto generator, and the current which it affords is measured on a separate scale upon the dial of the power indicating instrument, which is calibrated so as to read in terms of speed.

A most vital point in the construction of this instrument is that of the thermo couple incorporated with each spark plug in order to avoid the possibility that the thermo couple may cause preignition by becoming too hot or be disintegrated by the heat. By very extensive experimentation a special form of thermo couple has been developed, which, it is claimed, is entirely free from these objections, and which will give the same readings upon the recording instrument even after 50,000 miles of service.

### GREAT QUESTIONS OF AUTOMOBILE ENGINEERING.

#### Valve Location.

By Albert L. Clough.

Valve location is of moment mainly in regard to its bearing upon the form of the cylinder to which such valves are applied, and in regard to the operating mechanism and piping which the various arrangements imply.

While there are a number of special valve arrangements, each to be found upon one or two makes of cars, practice seems to have settled down to two forms of pocketed valves; namely, first, that in which a pocket upon one side of the cylinder contains the exhaust valve and another similar pocket upon the other side of the cylinder contains the inlet valve, and second, that in which both valves are located in a single chamber upon one side of the cylinder. The cylinder in which the first arrangement is embodied is known from its form as the T cylinder, and that in which the second method prevails the L cylinder.

Distinct from this construction, in which the valves occupy pockets or communicating chambers upon the sides of the cylinder heads, is the valve in the head arrangement, which is employed by enough manufacturers to give it importance.

Among the advantages which may be cited in regard to the valve in the head arrangement or overhead valve arrangement may be mentioned the following:

That the form of the cylinder which is demanded by theory on the ground of thermal efficiency (that of a perfect cylinder with domed head) is practicable with overhead valves, and that the high efficiency which theory ascribes to this form of cylinder, with its minimum wall space per unit of volume and its consequent low loss of heat to the jacket water, is attained by their use.

That the reduced loss of heat through the walls obtained by eliminating the interior exposed surface of the valve pockets makes cooling of the cylinder easier, and reduces the radiator capacity required.

That the cylinder, being perfectly cylindrical and free from projections, warps less in manufacture and is free from the liability of distortion in service. Furthermore, that having no attached pockets, its entire inside surface can be machined, the clearance space thus adjusted, and any fins or "swags" likely to cause preignition readily removed.

That upon the opening of an overhead exhaust valve the spent gases directly leave the cylinder, and do not have to pass through any pocket in making their exit.

That if an overhead cam shaft is used to operate the valves there is no cam shaft in the crank case, and there is room saved so that the inspection plates may be made

large enough to permit of removing the pistons therethrough.

Among the disadvantages urged against overhead valves are the following:

That the valve, in order to be removable for regrinding, must be carried in a cage, and that the joint between the cage and its seat in the cylinder reduces the rate of cooling, and allows the exhaust valve to distort and pit, and that the possible chance of an air leak into the intake system is increased. It is also difficult to arrange matters so that the exhaust valve stem shall be adequately cooled. That the machining of the cylinder to take overhead valves is costly. Furthermore, that the valve action is complicated and expensive. If an overhead cam shaft is employed a vertical shaft, with additional gears and bearings, is required to give it motion, and that the cam shaft in this position is difficult to lubricate, and requires a special housing. That the rocker arms required to communicate motion from the cams to the valve stems add to the complication of the arrangement, That the rocker arms, despite the use of "take up" springs and fibre tipped tappets, make more noise than the mechanism of direct actuated valves. That if the overhead cam shaft is not used, the walking beams employed to operate the valves are subject to the same objections as to complication and noisy operation.

In addition, if the caged valve construction is adopted to render the valves removable, it is usually necessary to break the pipe connections when a valve is taken out, and, moreover, that a valve in the head engine is less sure to fire its charges at very low throttle openings.

The advantages claimed for pocketed valves are that they require no caged construction, but seat directly in the metal of the cylinder, and thus may be more adequately cooled by water circulating about their seats and even about their stem guides. At the same time they may readily be removed by unscrewing the caps which close apertures in the upper walls of the pockets, without disturbing the piping. They are directly operable by push rods, actuated by the cams of an enclosed cam shaft supported by and housed in the crank case structure, this mechanism being simple and quiet.

In criticism of the pocketed construction it is pointed out that the walls of the pockets offer surfaces which withdraw heat from the burning charge and act to materially reduce the ratio of the pressures existing within the cylinder after and prior to the explosion, thus reducing the output and efficiency of the engine.

That the cylinder, not being of true cylindrical form, is subject to warping in service, and as the internal surfaces of the

pockets cannot well be completely machined, the compression space cannot be perfectly adjusted.

That the charge and exhaust gases do not follow so direct a path in moving through the valves and ports in the pocketed construction as in the overhead construction, which tends toward a lowering of the charge ratio, and hence the output of the cylinder, and also tends to raise the exhaust back pressure.

As to the relative advantages of the T and L construction, it is urged that the T cylinder, being symmetrical as to its projections, is less likely to warp out of usable shape in casting than is the L cylinder, with its unsymmetrical form, and that the valve diameter is not restricted by the necessity of placing two valves and their surrounding metal and water spaces in a length equal to the cylinder diameter. That the piping, being distributed equally upon both sides of the engine, is less crowded, and the valves and their mechanism are more accessible. That in event of inlet valve trouble it can be rectified without danger of burning from the hot exhaust pipe.

As disadvantages, it is pointed out that the cooling surface exposed to the explosion by the pockets is very large in this construction, and that there is a tendency toward distortion due to the difference in temperature between the inlet and exhaust sides. That two separate cam shafts are required to operate inlet and exhaust valves, respectively, and that this entails unnecessary expense in manufacture and upkeep, adds some weight and increases the noise.

Among the advantages claimed for the L cylinder arrangement are that but one cam shaft is required, which eliminates several gears, one cam shaft and its bearings, and makes it possible to provide very large crank case hand holes on the opposite side of the engine. That the valves and piping being all upon one side, the other side of the engine is left perfectly "clean" for the location of the auxiliaries. That the cool, incoming charge tends to reduce the temperature of the exhaust valve located close beside it, and helps to keep the whole valve pocket at a reasonable temperature.

That the total surface, causing loss by cooling the expanding gases, is less than in the T cylinder, and that the engine is consequently a little more efficient. That it is the least expensive construction considering the results obtained.

As an offset to these advantages it is claimed that the piping is very much crowded upon one side of the engine, and that it is impracticable to adopt as large valves as in the T construction without making the pocket overhang the cylinder fore and aft or by using valves inclined to the cylinder axis.

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#### Trackless Trolley Automobiles.

It has always been a puzzling question why the trackless trolley system, which appears to be in considerable vogue in Continental Europe, has never gained a foothold in this country. One of the reasons for this undoubtedly is the comparative lack of good roads in this country. The cost of installation of a trackless trolley line is necessarily relatively high, as compared with a gasoline motor service, as in addition to the rolling stock an electric power station and a transmission line are required. If in addition there is no suitable road for the vehicles to travel on, and the company are compelled to build their own road, or at least contribute to the cost of construction in consideration of a franchise, then a street car line would generally be preferred where there are sufficient prospects of building development, or the motor bus line where there is little immediate chance for growth of the traffic requirements. The field of the trackless trolley may be considered as intermediate

between that of the other two means of transit mentioned. The system is certainly intermediate between these two in respect to capital required.

Electric railways have been very thoroughly developed in this country; that is to say, there are probably as many instances where trolley lines are established in districts that are barely able to support them as there are of districts able to support such services which do not already have them. Where the transit requirements are limited the motor omnibus propelled by gasoline is generally chosen because of the very much smaller risks involved. Practically the only equipment necessary is the rolling stock, and this could be sold again with only a reasonable loss if the venture should prove a failure; whereas if a trackless trolley line were installed and proved a failure the loss would inevitably be quite heavy, as the transmission line would be almost a total loss, and the power plant would probably also have to be disposed of at a great sacrifice. The trackless trolley, therefore, seems to be best adapted for thoroughly settled communities where the volume of traffic can be fairly definitely determined in advance, and where the roads are in good condition.

In our leading article this week are described two of the systems on which a number of lines have been established in Germany and Austria. A third system, brought out in Italy, was described and illustrated in our issue of April 15, 1908.

## Extension of the Use of the Taximeter.

When the taxicab was first introduced in one of the largest American cities one of the first things which struck the general public was the apparently low rate for service as compared to the regular back rates. The charge of the transportation of as many as four persons from the residential district to the most frequently used depots seldom exceeded 40 cents, as against 50 cents per person in the case of cab rates. This naturally created quite a demand for the taxicab. A firm which had been in the auto renting business for some time, observing the popularity of the taxicab, fitted some of their machines with taximeters, and rented them either by the meter or by the hour, their rates by the hour being \$5 for the first hour (minimum), and \$4 for each succeeding hour. These machines were touring cars capable of carrying five besides the driver, and capable of making 15 or more miles per hour on the

average trip, including stops. Many of the older customers thought that they would prefer to hire the machines by meter, the rate per mile being 40 cents. A little reflection will show that an hour's use of the machine by meter costs the customer upward of \$6. The result is that the meters are now seldom used by this firm except for short distance trips.

As a matter of fact the taxicab is seldom used for trips of over 2 or 3 miles. Under these circumstances the amount of "dead" mileage becomes excessive, and to offset this a relatively high rate must be charged. To show what this dead mileage amounts to in regular taxicab work, one of the managers of a taxicab company in that same city stated that if the receipts of a cab came to 30 cents per total mile or more, the company felt satisfied. As this figure includes not only the initial charge, which is in excess of the regular 40 cent per mile rate, as well as the waiting time charge and extras, it can readily be seen that the "dead" mileage amounts to a considerable portion of the total. However, in the case of the longer trips the proportion of dead to live mileage is very much reduced. It would seem that to fit the taximeter to operate more equitably for long distance trips, it might be arranged to operate under a tariff which could be called the long distance tariff, having, let us say, a minimum rate of \$3 for 6 miles, and a rate of 10 cents per third of a mile thereafter, with perhaps the usual dollar per hour waiting time.

There is even now a considerable tendency to use taximeters on touring cars for hire. In many cases the instrument is placed in an inconspicuous place on the dash or foot board, or even in the tonneau.

The renting of automobiles for long distance trips is constantly growing, and it would therefore seem to be the part of wisdom for the manufacturers of taximeters to look into this matter with a view to adapting the instrument to differential tariffs for short and long distances respectively.

#### Rear Number Lamps.

The subject of the illumination of the rear number tag in such a manner that the number can readily be read in the dark by persons in the street is of late receiving considerable attention. In New York State at the present time the law requires the registration number to be carried on the lenses of the side lamps in figures

I inch high. This arrangement is not particularly satisfactory, because it necessitates either the painting of the numbers on the lamp glasses or the provision of stenciled number strips for both front lamps in addition to the rear tags, and besides the figures are necessarily so small that they are practically useless for identification purposes except when the car is stationary. Besides the proper place for the position of an identification tag is at the rear of the car, instead of at the front.

Other States, notably Massachusetts, following the example set by France, require the illumination of the rear number tag. This has in the past generally been accomplished by tail lights of the kerosene variety, which, in addition to throwing a red light to the rear, throw a beam of light sideways onto the number. It is self evident that the usual size of rear number tags, properly illuminated, serves much better the purpose of identification at night than the small front lamp numbers, and the only trouble which has been encountered with the above arrangement is that occasionally the lamp would blow out or jar out without the driver becoming aware of the fact. The driver of the car in such cases is liable to punishment for violation of the law, and a number of such cases have been reported from abroad. Though the breach of the law in such a case is unintentional, it is generally impossible to prove this. The risk of annoyance from this source has been greatly lessened by the introduction of electric rear lamps combined with number plates. These are not affected by gusts of wind or the jarring of the vehicle on rough roads, except in so far as the latter lessen the life of the lamp filaments, which for the low voltage employed is quite considerable. Any interruption in the supply of the current due to the source thereof would affect the side lamps equally, and would therefore immediately become apparent to the driver.

#### Engine Bonnet Fashions.

It is interesting to speculate as to whether a return to the sloping hood is among the possibilities. One manufacturer has brought out a line of cars which includes models with both the French type of sloping bonnet, with the radiator close to the dash, and the German type, with the familiar bonnet of rectangular longitudinal section, with the radiator closing its front. Another

manufacturer has announced a "twenty" with a typical French sloping hood.

It will be remembered that the sloping bonnet was a common feature of American cars until the contrary fashion of the square bonnet was set by a very famous make of German car. Immediately thereafter the hoods of all American cars assumed their present straight line profile, irrespective of whether there was a motor or merely gasoline and water tanks beneath them.

One of the best known American runabouts has adhered to the curved, sloping style of hood for many years, and there have been enough of certain French makes of cars in operation upon the streets of the large cities to keep the sloping bonnet somewhat familiar to the public.

Whether there is any actual æsthetic advantage of one type over the other, and whether "the curved line is a line of beauty" as applied to automobiles, is an open question. Taste in these matters is apt to be fickle and founded upon no defendable basis.

Certain it is, however, that the curved, sloping bonnet, with rear mounted radiator, possesses certain technical advantages in the increased accessibility which it affords to the motor, and the less road dust which is distributed over the engine and auxiliaries when it is used.

At the present time there seems less tendency blindly to copy the external features of famous or popular cars, and more willingness carefully and cold-bloodedly to weigh the advantages of differing features, from the engineering stand-point.

It may be that the instances above noted indicate that designers are beginning to consider with favor the so-called French type of hood, and that it may in the near future become a common feature of American cars.

#### The Doom of Macadam Roads (?).

During the past several years the lack of wearing qualities of ordinary macadamized roads under automobile traffic has been frequently discussed, and extensive experiments have been made all over the world with the object of developing systems of road construction which would insure roads able to resist the wear and tear of automobile travel. Foremost among these experiments have been those of our own national Government through the Bureau of Public Roads. It is now generally recognized that some elastic binder, such as tar or asphalt,

is necessary to secure the requisite wearing qualities, and further experiments should be directed toward the cheapening of the process of applying this binder.

The first definite step toward applying this method of road construction outside of parks and boulevards seems to have been taken by Public Road Commissioner Gilkyson, of New Jersey, who, as reported elsewhere in this issue, has approached the national Government with a proposal for the creation of a National Road Commission. apparently to follow up the experimentai work done by the Bureau of Public Roads, to devise methods for the application of the experimental results to road construction on a large scale. It must be understood that the chief objects of the experiments so far have been to determine the dustless and wearing qualities of roads made with different binding materials in various ways. What Mr. Gilkyson has in mind seems to be the development from these experiments of a system of road construction that can be recommended as most suitable for present road traffic, and of a set of specifications which can be made use of by local authorities in soliciting bids for road building. The main idea seems to be to combat monopo listic tendencies in this line of public work. which, if allowed to go unchecked, would be likely to have a retarding effect on the good roads movement.

We would like to point out, however, that the figures of cost mentioned in connection with the report can hardly be correct. It is inconceivable that a road with an elastic binding material should be cheaper to surface than an ordinary macadamized road. Perhaps the figures given for comparison refer to the prices for some of the special systems of road construction that have been developed privately, instead of to macadam roads.

The movement started by Mr. Gilkyson is of tremendous importance to motorists as well as to the general public living along much traveled highways, for if successful it would mean the practical abolition of the dust nuisance.

J. Fred Betz, 3d, of Philadelphia, has offered a prize of \$500 in either cash or plate for a small car race to be conducted by the Quaker City Motor Club in conjunction with the annual race in the Fairmount Park. The officials of the club are at present considering the proposal of holding this race, and opinion is said to be divided as to whether the race should be run simultaneously with the race for big cars or early in the morning before the race for big cars starts.

### Calculation of Chassis Springs-IV.

#### By David Landau and Asher Golden.

FACTORS OF SAFETY.

It is always of interest in any design to know to what extent the materials involved are stressed, and how safe our structure is. Factors of safety in spring design are limited by the flexibility. The desire to make a spring stronger by increasing the number of leaves or their width and thickness results in a harder spring than that required to give a predetermined flexibility. The only means of strengthening is to use a material of greater elastic elongation.

The fibre stress at any point of a cantilever is, as shown above:

$$S = \frac{Px}{Z}$$
.

If the cantilever is a simple leaf of width b and thickness t then  $z = \frac{b t^2}{6}$ . If it is

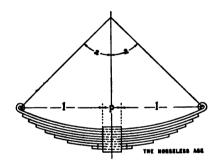


FIG. 2. (Referred to in Instalment II.)

made up of n superposed leaves of thicknesses  $t_1, t_2, \ldots, t_n$ , every leaf adds its own strength to make up the strength of the entire cantilever, that is, the spring. The fibre stress at any point is then

$$S = \frac{Px}{\frac{b t_1^2}{6} + \frac{b t_2^2}{6} + \dots + \frac{b t_n^2}{6}}$$

$$= \frac{Px}{\sum Z}$$
 (22)

To facilitate calculation we give below Tables VII and VIII of values of Z for leaves of widths and thicknesses currently employed in American and foreign practice.

In the examples which follow, of the application of equation (22), the leaves are assumed to be tapered so that the spring is of uniform strength. The bending moment may be taken at any point, provided the thicknesses of the leaves are taken at the same point. However, it is most convenient to take the bending moment at the spring seat; or, more strictly, at the spring centre, since at this point the leaves have their initial thickness.

Table IX shows the fibre stress and factors of safety of four actual springs having good riding qualities. The first two are made of an alloy steel having an elastic limit of 184,000 pounds per square inch, with an elastic elongation of 0.0065; the second two are made of a high grade open

hearth steel having an elastic limit of 142,000 pounds per square inch with an elastic elongation of 0.0052. Dimensions are in inches, loads in pounds and fibre stresses in pounds per square inch.

SEMI-ELLIPTIC SPRINGS USED AS RADIUS RODS.

There are a number of cars in which the radius rods are eliminated, the driving effort being exerted through the medium of the top leaf of the spring. We do not be-

Table VII.
SECTION MODULI OF SPRING LEAVES (in cu. m/m).

Thick- ness, m/m.		WIDTH OF LEAVES IN M/M														
	40	42	45	50	55	•0	65	70	75	<b>80</b>						
5	167	175	188	206	229	250	272	292	313	333						
5.5	201	212	227	252	277	302	327	352	377	408						
6	240	252	270	300	830	860	890	420	450	480						
6.5	282	296	817	852	887	430	467	492	527	562						
7	327	343	867	407	450	490	531	572	614	645						
7.5	875	898	422	468	515	552	610	655	702	750						
8	427	449	480	535	588	640	695	743	800	855						
8.5	481	505	542	602	661	722	781	848	902	964						
9	540	568	608	675	742	810	877	945	1011	1090						
10	667	700	750	833	917	1000	1089	1168	1250	1835						
11	805	845	906	1008	1110	1210	1310	1410	1510	1610						
12	906	1009	1080	1200	1820	1440	1560	1680	1800	1920						
13	1130	1185	1270	1410	1550	1690	1835	1475	2110	2260						
14	1310	1372	1470	1635	1800	1980	2120	2290	2450	2620						

TABLE VIII.
SECTION MODULI OF SPRING LEAVES IN CUBIC INCHES.

Stub's	Thick-	WIDTH OF LEAVES IN INCHES.											
English Gauge.	ness.	1.75	2.0	2.25	2.5	2.75	3.0	3.25					
0000	.454	.06011	.069	.07775	.0865	.095	.1038	.1125					
00	.880	.0422	.0482	.05425	.0602	.06625	.07225	.0782					
0	.840	.0338	.0386	.0485	.04825	.05315	.058	.0627					
1	.800	.02625	.0300	.0339	.0375	.04125	.045	.0487					
2	.284	.0235	.0269	.0802	.0336	.0369	. 04025	.0432					
8	.259	.01955	.0224	.0252	.0279	.0807	.0335	.0363					
4	.239	.0165	.0189	.0213	.0286	.026	.0273	.0307					
5	.220	.0141	.01612	.0181	.0204	.0222	.0242	.0262					
6	.203	.01205	.01975	.01545	.01715	.0189	.0206	.0224					

TABLE IX.

	1	2	3	4
Length under load	38	54	31à	50
Flexibility (inches per 100 pounds)	.25	.475	.25	.518
Thickness of individual leaves	.300	.300	.259	.300
	.284	.284	.238	.284
	.284	.284	.238	.284
	.238	.284	.220	. 250
	.238	.259	.220	. 256
	.238	.259	.220	. 238
· ·		.288		. 239
•		.220		. 203
Width of leaves	2.25	2.50	2.00	2.25
Load on one end of spring	363	495	280	410
Fibre stress	43600	56250	41200	50500
Factor of safety	4.22	8.27	8.46	2.81

lieve there is any consideration to justify the employment of this arrangement owing to the additional stresses it imposes on the springs, which, as is seen from the table above, are already quite high. If the entire spring were solid, instead of being laminated, or if it were possible to make the top leaf quite thick without affecting the flexibility, there would be some reason for using the spring to perform the dual function of spring and radius rod.

But in order to make the spring flexible it is necessary to limit the thickness of the top leaf; further, mechanical considerations make it necessary to give all the leaves an initial curvature; hence we see that these two characteristics—the thinness and the initial curvature—put the top leaf in the worst possible form to resist the compressive action of the driving effort.

The stress imposed in the top leaf by the driving effort is not a negligible quantity. This will be shown clearly by an example. We will take for this purpose the second spring in the table above. The stress due to the downward load is 56,250 pounds per square inch. The stress due to the driving effort of, say, 100 pounds, considering the top leaf as an eccentrically loaded column with fixed ends, is about 8,400 pounds per square inch, making the total stress 64,650 pounds per square inch, and reducing the factor of safety from 3.27 to 2.85. This is a considerable reduction where the factor of safety is already low.

We will now take the same spring and thicken the top leaf to see its effect on the fibre stress and the factor of safety. We will increase the top leaf to 0.425 inch, but in doing this it must be observed that to preserve the same flexibility it is necessary to make the other leaves thinner. In other words the sum of the moments of elasticity must be the same in both cases. As seen from the table the spring has eight leaves of the thickness shown. Going to our table of moments of elasticity we find  $\Sigma$  (EI) to be 902,000. We now change the top leaf to 0.425 inch with a moment of elasticity of 447,500. To this must be added other moments to bring the sum to 902,000. In this way we get six leaves of the following thicknesses: 0.425, 0.284, 0.259, 0.238, 0.238, 0.220. The maximum stress due to downward loading is now 64,750, and the factor of safety 2.85. The additional stress due to the driving effort is now 4,350, making the combined stress 69,100 pounds per square inch, and the factor of safety 2.66.

#### OTHER TYPES OF SPRINGS.

We have discussed above but a single type of spring—the semi-elliptic—which we may well call the basic type. It is the type most generally used; all others are made up partly or entirely of semi-elliptics.

The object of employing other types is to get an equivalent long spring in a short space. We will not touch on these any more than to point out the method of finding their total flexibility. We will take first the three-quarter elliptic spring.

The flexibility of a spring is proportional to the cube of its length, the other dimensions being constant. It is, therefore, only necessary to add the flexibility of the half spring per 50 pounds to the flexibility of the semi-elliptic portion per 100 pounds. This will be clear from an example. If the flexibility of the semi-elliptic portion of a spring is 0.625 per 100 pounds, and that of the half spring is 0.286 per 50 pounds, the total flexibility will be 0.625 +0.286/2 = 0.769 per 100 pounds. The platform spring may be treated in the same way. This is practically a three-quarter elliptic spring with the half spring in the rear instead of on the sides.

The flexibility of a full elliptic spring is double that of a semi-elliptic.

#### THE WEIGHT OF A SPRING.

There is no formula for finding the exact weight of a leaf spring. A number of springs made by different manufacturers

The developed length of the master leaf is approximately

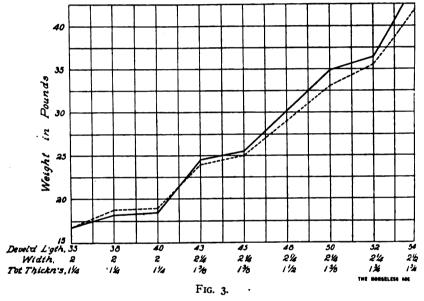
$$s=\sqrt{L^2+\frac{16}{3}h^2},$$

where h is the opening of the spring.

Too much faith should not be pinned to a formula before it is tried on a number of actual cases and found to be reliable. Unless this is done it is impossible to tell whether a formula will give right or wrong results.

The spring maker can determine the weight of his springs in a simple manner after weighing up a large number of springs which he considers good suspensions, and constructing a curve such as that shown (merely for illustration) in Fig. 3. The method of constructing the curve will be evident from the figure.

To find the weight of a spring not shown on the curve it is only necessary to observe



may have the same general form and dimensions, although the taper and grading of the leaves may be quite different and sufficient to make a marked difference in the weight. We can, however, in a general way, have a formula which will apply to all cases provided the proper constant is used for any particular make of spring. It is, moreover, possible to have a formula, involving a single constant for all cases, which will give fairly close approximations to the actual weight. In a general way, the weight of a semi-elliptic spring is  $w = KsbT, \dots (14)$ where K is a constant depending on the taper and the grading of the leaves, s is the developed length of the master leaf, b is the width of the leaves, and T is the maximum total thickness of the spring. To get exact weights for a particular make of springs, K must be determined experimentally by weighing up a large number of

Equation (14) will give fairly close approximations for all cases if we make K equal to 0.175 to 0.19.

that the weights of two springs whose developed length, width and total thickness are, respectively, s., b1, T1 and s2, b2, T2 are to each other as

$$\frac{s_1 b_1 T_1}{s_2 b_2 T_2}$$

If we assume  $s_1$ ,  $b_1$ ,  $T_1$  to be the dimensions of the spring whose weight  $u_1$  is to be found, then the denominator  $s_1b_1T_1$  is found from the curve. An example will make this clear. Let it be required to find the weight of a spring having a developed length of 46 inches, width 2 inches and total thickness 2 inches. From the curve we pick out a spring having dimensions close to these; for instance, the spring having a developed length of 48 inches, width 2½ inches, and total thickness 1½ inches. and weighing 29 pounds. The weight of the first spring is then

$$29 \times \frac{46 \times 2 \times 2}{48 \times 21 \times 11} = 33$$
 pounds.

As a check on this the weight may also be calculated from the formula.

Where the dimensions of the unknown

spring happen to be the same as those on the curve the weight of the spring is found directly without calculation. It may seem useless to construct a curve when a formula as (14) can be employed. The disadvantage of a formula is that it is only approximate; correction factors are necessary to bring the calculated weight close to the actual. A curve constructed on the basis of actual weights gives results whose deviation from the true weight is negligible.

The dotted curve shows the weights calculated from the formula. In some cases the calculated weights will be lower than the actual; in other cases they will be higher, especially for long springs. The two curves always show the defect in weight between the actual and the calculated values. Where a curve does not happen to be handy the formula will give fairly close approximations. As stated above, the curve shown in the figure is merely for illustration.

#### MATERIALS.

The materials generally used for springs may be classified under the following heads: Carbon spring steel, chrome nickel steel, chrome vanadium steel, and manganosilicon steels.

Under the head of carbon spring steel, the material usually employed runs fairly high in carbon, the carbon content being about 1 per cent. and manganese 0.3 per cent. This material will show the following characteristics, depending on the method of treatment:

Elastic limit	64,000 to 100,000
Ultimate strength	125,000 to 186,000
Elongation	8.5 to 9.5 per cent.
Reduction	15 to 16 per cent.

The chrome nickel steels usually have 0.37 carbon; manganese 0.34; chromium 0.85 to 0.95; nickel about 1.75 per cent, and the following characteristics, depending on the heat treatment:

Elastic lim	it		i.	4				*				86	5,00	00	to	13	5,000
Tensile str	ength		* 1					*		ì,		IOC	0,00	00	to	15	0,000
Elongation		 			.:	i.	×		.,			22	to	1	5 P	er	cent.
Reduction		.,									2	63	to	5.	3 P	er	cent.

Chrome vanadium steels, spring tempered, contain from 0.35 to 0.42 carbon; manganese about 0.75; chromium 1.22; vanadium 0.19; the characteristics are as follows: Elastic limit. 183,000 Tensile strength. 187,000 Elongation 14 per cent. Reduction 50 per cent.

Mangano-silicon steels have approximately 0.40 to 0.50 carbon; 1.50 to 1.90 silicon; manganese 0.70 to 1.00 nickel, about 0.50; sulphur and phosphorus each less than 0.035. This steel shows the following characteristics after treatment for springs:

This last material is most frequently used at the present time by foreign spring makers, such as Lemoine and Krupp.

The treatment of these steels is beyond the purpose of this article since no fixed instructions can be given for any class, and generalizations are entirely useless.

#### Louisiana Good Roads Convention.

"No one should oppose good roads any more than he should oppose public schools," said President A. C. Jackson, of the National Good Roads Association, at the Louisiana Good Roads meeting at the Hotel Grunewald on November 10. Every delegate agreed with President Jackson. The most important development of the meeting from a local standpoint was the booming of New Orleans for the next convention of the National Good Roads Association. New Orleans was suggested by President Jackson. Local men decided to start a movement immediately to get the convention for the city. Several hundred autoists, good roads enthusiasts, Governor Sanders of Louisiana, Mayor Behrman of New Orleans, and city and State officials attended. The meeting was enthusiastic and many good suggestions were put forth.

President Jackson, who went to New Orleans for the convention from Chicago, said he expected a larger attendance than was present. He said it was only one of the indications, though, that the public had not yet begun to realize the importance of the good roads movement.

President Charles A. Farwell, of the New Orleans-Baton Rouge Good Roads Association, opened the convention by introducing President Philip Werlein, of the New Orleans Progressive Union. President Werlein said the good roads movement was especially timely in Louisiana, because all Louisiana was discussing waterways now, and waterways would be nothing without good roads. He said the plan for good roads had been encouraged by Governor Sanders, and the people ought to give it their encouragement. He declared the question of building State owned roads would be brought up before the Legislature when it meets next May.

Mayor Behrman called attention to the benefits truck farmers would get from good roads. The city authorities, he said, favor improved highways. What improved streets are to a city improved highways are to a State, he declared. Major F. M. Kerr, State Engineer, spoke on the best material for good roads. He said the surfacing material was important. The best, though, was low enough in price to keep the cost of the roads within reasonable limits. Louisiana has quantities of gravel and other stone deposits, and these make the finest kind of material for road building. Roads in Louisiana, where the ground is extremely low, should be made as nearly as possible impervious to water.

Governor Sanders spoke of the model road started between New Orleans and Baton Rouge, the capital of the State. The road will be about 89 miles long. The different counties through which this as well all other "good roads" will pass tax themselves to construct and maintain the roads. The roads are built by

convict labor. Expert road builders for the work are furnished by the Bureau of Good Roads in Washington. After explaining this Governor Sanders said: "That Baton Rouge-New Orleans road must be built before the end of 1910.

#### A. A. A. Annual Meeting.

Speed regulations and the necessity for a more stringent observance of the rules of the road formed one of the most important topics of discussion yesterday (Tuesday) at the annual meeting of the American Automobile Association at the Hotel Belmont, New York. About fifty directors were present, the States most generously represented being New York, New Jersey, Massachusetts, Pennsylvania, Connecticut, Minnesota, Michigan and Ohio.

Oliver A. Quayle, chairman of the Legislative Committee of the New York State A. A., opened the subject of reckless driving, by presenting the following resolution:

Resolved, That the A. A. A. places itself upon record as being unalterably opposed to the unfair use of the highways by criminal and lawless operators of motor driven vehicles, and, furthermore, this national organization of automobile owners calls upon its various State associations to propose and secure the passage of laws which shall rid the highways of reckless and inconsiderate drivers even to the extent of revocation of licenses and jail penalties in proportion to the nature of the offences.

Mr. Quayle believed that automobile legislation would be one of the important matters that the incoming legislature at Albany will have to deal with, and he intimated that an automobile bill might be the first measure introduced.

A large part of the meeting was devoted to the presentation of reports by the officers and chairmen of the various boards. The new directors will meet today for the election of officers. Both the secretary's and treasurer's reports show that the national organization is in the best condition, numerically and financially, in its history. Treasurer H. A. Bonnell reported an approximate balance of \$13,000. Secretary Elliott's report showed that during the past year the membership has increased by 50 per cent., the membership being 25,759, representing thirty State associations. The total number of clubs affiliated with the A. A. A. is 225. Six new State associations were formed during the year.

President Lewis R. Speare's report dealt with the increasing interest in automobiling in the various phases throughout the country as shown by the success of the work done by the contest, legislative, good roads, and touring information boards.

A resolution was introduced by Chairman Charles Thaddeus Terry, of the Legislative Board, expressing the gratitude of the association for the successful efforts of the retiring chairman, Frank E. Hower, of the contest board; it was unanimously adopted.

### DESCRIPTIONS OF NEW VEHICLES AND PARTS.

#### Baker Electrics for 1910.

The Baker Motor Vehicle Company, of Cleveland, Ohio, after having successfully used the bevel gear drive on their larger type of cars for several years, have adopted this form of drive for all of their cars for 1910. Nearly all of the gasoline car manufacturers have abandoned chains in favor of the bevel gear shaft drive, on account of the cleanliness, simplicity of construction, protection against dirt and absence of lost motion in the latter. With the shaft drive there is no need for adjustment, and the constant lubrication insures long life to the parts. In an electric vehicle, transmission efficiency is, of course, of the highest importance, on account of the limited store of energy carried, and the Baker Company claim that after extended experiments they have succeeded in developing a shaft drive which excels in efficiency all other forms of transmission.

The bevel gear driven axle is of the semi-floating type. The entire axle housing is drawn from sheet steel, and all the bearings in the axle are of the ball type. The axle shafts and the pinion shafts are made of vanadium steel, heat treated. The differential comprises a three armed spider, and provision is made for a self aligning movement of the differential pinions. All of the gears in the differential and the rear axle driving set have plain teeth, and are hardened. All of the bearings are ground to size with the aid of limit gauges, to within 0.00025 inch.

The front axle hub is drawn from sheet steel, and the pressings are accurately machined and fitted with ball bearings. The front axle is tubular, consisting of semi-spring temper steel with drop forged yokes electrically welded to the tubing. The front axle spring seats are machined from steel and secured to the tubing.

The motor is of four pole design, series wound, and provided with an especially

large commutator. It is said to be larger than the motors ordinarily used in electric vehicles, and to possess electrical characteristics making it impossible to injure it by overloading, etc. The supply of current to the motor is regulated by means of a controller of the continuous torque drum type, which affords six forward speeds and three backward, all being obtained by means of a single

The controller is provided with a safety device which precludes the possibility of slipping into the reverse when shutting off the power. A special lock is now provided for the controller, on which a patent is pending. This lock is entirely mechanical and claimed to be very simple and reliable.

From the motor shaft the power is transmitted to a countershaft by means

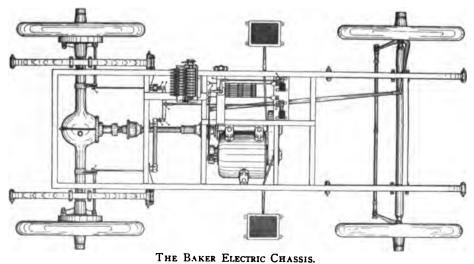


BAKER ELECTRIC FOUR PASSENGER COUPE.

lever. No special pedals or switches are used. It is claimed for this controller that there is no arcing or fusing at the contact points, and that it gives a gradual increase in speed, accompanied by a step-by-step increase in the current as the controller lever is moved from one position to that of the next higher speed. There is said to be no jerking motion either in starting or increasing the speed.

of a Renold silent chain provided with an eccentric adjustment and enclosed in an oil and dust proof case. The propeller shaft contains two universal joints. A novel feature is also found in the spring suspension, on which a patent has also been applied for. The front ends of the full elliptic rear springs are connected to the frame by a novel shackle, which is claimed to permit the omission of the radius rods and torque rod. The springs are provided with reamed bronze bushings, and the spring bolts are made from alloy steel, ground to size and provided with a special oiling atachment. The wheel base on the new models has been increased to 80 inches by moving the front axle farther forward and extending the frame.

The bodies of the 1910 models are more roomy and comfortable, and all cars are equipped with continuous fenders. The standard battery equipment for victorias and coupés has been increased from 24 to 28 cells of the 9 M. V. Exide type, which are connected in series for all speeds. All of the new cars are equipped with three brakes, two internal expanding brakes lined with Thermoid acting on drums on the rear wheels, and an emergency brake



being secured to the motor. All of the brakes are operated through steel rods, and the expanding brakes on the rear wheels are operated by one pedal through an equalizing lever.

It is stated that special care is being taken with the wiring of the cars, the wire sizes being easily large enough to carry the heaviest possible loads, and the entire wiring system being methodically arranged, and the wires insulated with the best rubber insulation to withstand acid, weather and mechanical strains. All of the mechanical connections are securely locked.

#### New Diamond Demountable Rim.

The latest addition to the line of the Diamond Rubber Company, of Akron, Ohio, is the new Diamond demountable rim. The Diamond people have been working on and perfecting this rim for a considerable time. Particular stress is laid by the manufacturers on the fact that any blacksmith can apply the rim to an ordinary wheel felloe without special equipment. There are but two main members to this rim, one being the ordinarily shaped rim which holds the tire casing, and the other a rim that is shrunk on to the wheel. The inside of the felloe rim, which may be called the inside band, is slightly bell mouthed to conform to the inside of the tire rim proper, and forms its support. The tire rim is held in place by eight bolts of special design. The



THE HORSELESS AGE

NEW DIAMOND DEMOUNTABLE RIM. head of the bolt is square. The part resting on the felloe rim band is milled to fit the inside edge of this rim and act as a locating clamp, which the lower portion of the head is drilled and fixed to the felloe by a wood screw to prevent turning. Around the outside between the two rims are located eight wedges which are held in position by nuts and lock washers on the bolts above mentioned. The bolts and nuts are of standard size and thread, so that if a nut is lost it can be replaced at any country hardware store. As the new Diamond demountable rim can be fitted to any automobile wheel of standard construction, practically all individual owners of cars, as well as manufacturers or dealers, can avail themselves of the convenience it offers. To apply a fresh tire one simply has to jack up his car, remove the old tire by removing the wedges, slip the valve stem of the fresh tire into place through the hole in the felloe, and the rim will slide easily to place on the wheel. Then the wedges are put over the felloe bolts and the nuts are screwed up tight.

#### The Great Western Thirty.

The Great Western Automobile Company, of Peru, Ind., have decided to turn out the coming season only one size chassis with several designs of body, instead of the several styles and sizes produced heretofore. The new car will be known as "Great Western 30," and will be fitted with either a five passenger touring car, a four passenger toy tonneau, or a roadster body. The standard color will be drab coach blue, with cream running gear.

The motor used is a four cylinder, four

spacious over the cylinder heads, and especially around the exhaust valve cages and outlets, where the heat is most intense. The water is pumped into the cylinder at the bottom on the left hand side of the motor and discharged from the top over the exhaust ports through brass water connections to the radiator. The centrifugal pump is gear driven through an idler gear from the crank shaft gear, with a coupling between the pump and the driving gear, and also between the pump and the magneto, which is driven from the same shaft.



GREAT WESTERN THIRTY.

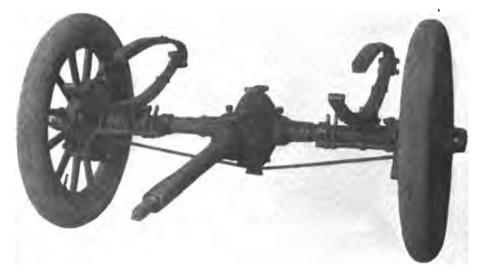
cycle, water cooled one of 4½ by 5 inch cylinder dimensions, with separately cast cylinders. It is made by the Model Gas Engine Company, of Peru.

The lubrication system is wholly self-contained, and consists of a reservoir below the splash basins, holding about two gallons of oil, which is claimed to be enough to run the car 600 to 800 miles. The oil is pumped by a gear pump, driven from the rear end of the cam shaft, by mitre gears, to the several main bearings. The over-flow from the bearings returns to the splash basins, from which it is distributed by the splash to the other moving parts.

The cooling is effected through a ball bearing, flat belt driven fan, a centrifugal pump and a vertical tube radiator. The water jackets of the cylinders are very This arrangement of couplings permits the removal of the magneto or pump without destroying any other parts of the motor. The fan is located on an eccentric stud for tightening the belt, and runs about two and a half times the motor speed.

The ignition is by a low-high tension magneto in connection with dry cell batteries for starting, both working through one distributor and a single set of spark plugs located over the inlet chambers. The cone clutch is covered with Raybestos, and has six engaging springs underneath to insure smooth engaging. Between the clutch and three speed selective transmission is located a double universal joint of the block and trunnion type, covered with a leather boot.

The transmission shafts are both carried



GREAT WESTERN REAR AXLE.

on Timken roller bearings. The propeller shaft is connected to the main transmission shaft through an enclosed sliding universal joint. The torque strains are taken by a swivel device bolted to the centre cross member of the main frame supporting the universal joint, the propeller shaft and the tube in which the shaft is enclosed. Within this tube, which is attached to the bridge casing of the rear axle, the propeller shaft revolves on two Timken bearings, one at the forward end and one at the rear next to the drive bevel pinion. Directly over the drive bevel pinion is an inspection plate which can easily be removed, permitting one to see the condition of the gears and differential. The differential, which is of bevel pinion type, is carried on Timken bearings. The rear axle tube ends are considerably heavier than on the former 30 horse power car and are parted vertically in the centre. The outer ends of the rear axle drive shafts are carried on roller bearings, while the hubs are keyed to taper seats. The front axle is an I section drop forging, and is much heavier than the one used on the 1909 model. The front wheels run on ball bearings. The front springs are semi-elliptic, 38 inches long, a slight increase in length. The rear springs are three-quarter scroll elliptic, instad of a full elliptic, as formerly, and are 42 inches long. The front portion of the lower member acts as the radius rod.

There are two sets of brakes, both operating on large pressed steel drums on the rear wheel hubs. The internal expanding brakes are the emergency brakes and operate through equalizers from a hand lever at the driver's right. The external contracting brakes are the service brakes, which also work through equalizers by pedal. The braking surface is very large, and it requires very little pressure to slide the rear wheels.

The sod pan for protecting the motor and transmission is carried well back to provide ample protection and is hinged on one side and provided with spring catches on the other, making it easy to drop for washing or adjustments. The steering gear is a worm and gear, with the gear a full wheel, allowing many adjustments. The spark and throttle control levers are set on a stationary quadrant above the 18 inch steering wheel.



PLAN OF WHITE GASOLINE TRUCK CHASSIS.

of channel section with a drop over the rear axle to give a low centre of gravity. The motor and transmission are carried on a sub-frame. The corners of the frame are reinforced with steel gussets. The wheels are twelve spoke artillery, carrying 34 inch tires with quick detachable rims.

While 56 inch is the standard tread, the car can also be supplied with 60 inch for Southern and Western roads. The gasoline tank is of galvanized sheet metal and located under the front seat; it holds 20 gallons. Each car is equipped with magneto, gas lamps, generator, two oil side lamps, one oil tail lamp, large tool box on rim running board, robe rail, horn, and complete set of tools.

#### The White Gasoline Truck

The White Company announce the a tion to their line of a gasoline truck ing a normal lead capacity of one a half tons. As shown in the ann illustration, the truck exhibits the neatness and simplicity of desi-White gasoline pleasure vehicle. gine used in the truck is the sta White gasoline engine with a bore o inches and a stroke of 556 inches. intake and exhaust passages form a tegral part of the engine casting, and valve stems and valve springs are pletely enclosed. The clutch is of leather faced come type; the transmi has four forward speeds, and the from the gear case to the rear axie means of a shaft. Both the engine an gear case are supported in the fran three point suspension.

In accordance with recent foreign patice the truck is fitted with postumatic teach rear wheel being fitted with two \$4\$ inch tires. The rear axle is so loo that when the truck is loaded practicall of the load is supported by the wheels, so that steering is rendered easy. The wheel base is \$144\$ inches; gear reduction ratio between the enshaft and the rear wheels on the didrive is 7 to 1. This truck chassis be fitted with any desired type of b such as platform, express, sightseeing of the such as the such

#### Gardner-Rix High Speed Air Compressor.

Among the recent additions to the of garage equipment in the market is air compressor that should meet the quirements of the average small garag well as of some of the larger ones. Class G compressor manufactured by Gardner Governor Company, of Qui Ill., is small in size, but large enough to ordinary demands. It can be set out of way, and is claimed to require little tention. The air is admitted through annular port in the air cylinder, at the let



SIDE VIEW OF THE WHITE GASOLINE TRUCK.

dle on the side.



#### GARDNER-RIX HIGH SPEED AIR COMPRESSOR.

end of the piston travel. The piston is 3 inches in diameter and has a 31/2 inch stroke. The air piston is of the trunk pattern, fitted with three spring rings, and is single acting, that is, it compresses the air on the upward stroke only. The discharge valve is a flat casting, seats on the top end of the cylinder, and is held in place by springs. The air piston comes to the extreme top of the cylinder on each upward stroke, so that there is no clearance, and the highest volume of efficiency is attained. The crank shaft, piston, piston rings and discharge valves are all ground to size. The piston pin is hollow, hardened and ground. The crank shaft and connecting rod are steel forgings. All bearings in the compressor are of white bronze and can be replaced when worn. The cylinder is water jacketed, and the jacket can be connected to an ordinary water line, allowing the waste to run into the sewer. The crank case is of the enclosed type, with hand holes on opposite sides for access to the connecting rod boxes. In these plates are fitted glass bullseyes so the operator can observe the oil level and the oil splash. The lower part of the crank case is filled with oil to such a height that the agitators on the crank shaft dip into this oil at every revolution, splashing oil to every moving part of the compressor. Oil pockets at the inside of each journal bearing keep these bearings supplied with lubricant. This compressor can be belted direct to the motor if desired.

#### Dover Sheet Metal Novelties.

The Dover Stamping and Manufacturing Company, Cambridge, Mass., have recently brought out several new gasoline funnels, a tourist oil and gasoline kit, and a garage gasoline filling measure.

One of the funnels is designed for the use of private owners, and is so arranged as to automatically shut off the gasoline in the funnel when the top level is reached. This is accomplished in the following manner: Within the funnel is a brass ball which is held up off the outlet hole when the funnel is in use, but as soon as the funnel is raised this ball drops back and covers the hole so that no more liquid can flow through. Those who have had experience with the overflow running all over the floor, seats and other parts of the car will appreciate this new device. The funnel is shaped similar to an ordinary funnel, but has a ring

for holding a straining chamois and a han-

The motorcycle funnel is made for the exclusive use of motorcyclists. It measures 5½ inches in height and has a 9½ inch opening in the spout to permit of fast pouring. It will fit in all tool bags, or can be easily carried in the pocket. It is copper plated, and has a very fine brass strainer to prevent dirt getting into the tank.

They have also added a gasoline funnel for garage use, which is furnished complete with chamois. The bowl is exceptionally large, drawn in one piece, having a large inside hoop with the chamois held firmly to the bottom. This hoop rests on two cross wires inside the bottom to prevent the chamois strainer from sagging. Outside it has a handle for convenience, and a large hoop on the base, which rests on the auto tank when in use and gives the funnel stability, and entirely does away with slopping from tilting. This funnel also has the ball shut off described above. While this funnel is made either copper plated or galvanized, the makers recommend the galvanized ones, because it keeps cleaner and never rusts.

The garage gasoline measure is made for both garage and autoists' use. This is made with 5 gallon capacity, of galvanized material, and has a seamless bowl on top, which prevents slopping when being carried full to the auto or lifted upon the running board to the tank,

The tourist oil and gasoline kit is a neat, compact and dustproof device for carrying extra oil and gasoline when touring. It is instantly attached and detached when desired. The outside box is made of heavier steel than heretofore, and the bottom is double seamed, instead of being soldered as formerly, the cover being heavily wired and the inside cans made of extra heavy material and furnished with an extension spout to facilitate pouring. A thick felt pad is placed in the bottom, on which the inside cans rest, thereby doing away with chafing. One of the two cans inside is for oil, the other for a reserve supply of gasoline, and both have a capacity of 11/2 gallons. The outside dimensions are 9x9x103/4 inches high.



MOTORCYCLE FUNNEL AND GASOLINE AND OIL KIT.

Livingston Radiator.

The Livingston Radiator and Manufacturing Company, recently incorporated with \$100,000 capital, have opened a factory at 312 West Fifty-second street. New York, where they are manufacturing the well known Livingston radiator. This radiator might be described as of the vertical, flat, staggered tube type, and while it is of the same appearance as the original true cellular radiator, it yet differs from it considerably in construction, as will be apparent from the following description. The radiator is composed of a series of long zigzag tubes 4 inches wide, or the full thickness of the radiator. These tubes are made of a special bronze and formed into shape in a specially constructed machine which forms the tube completely, leaving only the ends to be dipped and soldered for finishing. The vertical sides of these individual tubes are corrugated, which process not only lends strength lengthwise to the cell, but also adds radiating surface. It will be readily seen that the water entering at the top flows down through these several channels. and, being in a very thin film, cools quickly, owing to the fact that the film is exposed to radiation on both sides over this wide area. By studying the accompanying sketch the course of the water can easily be followed. At the bottom of these tubes is a reservoir from which the water is pumped into the water jackets of the cylinders. The housing of the radiator is composed of very few pieces, and is pressed into shape. The shapes into which these are formed lend greatly to the rigidness of the whole. The bottom is of one piece, the sides and top are of another, while there is a small piece added at the top, both front and back,



DOVER FUNNELS AND GASOLINE MEASURE.

which forms the sides of the top chamber. The top, sides and bottom, after being assembled together, are reinforced by strips of brass sweated into the corners. The radiator hanger brackets are not riveted directly to the radiator, but rather to plates insides the chamber over which are soldered brass sheets, keeping the rivets away from the water space. These hangers also extend well down below the lower bottom



LIVINGSTON RADIATOR.

curve. The tubes, after being assembled as a whole, are bound around the edges with brass strips, binding them into a solid mass which can be removed from the outer casing very easily. A hard rubber filler cap is used which has a brass lining in which the threads are cut for screwing on.

#### New Gilbert Specialties.

The Gilbert Manufacturing Company, of New Haven, Conn., have recently placed on the market several new extra tire carrying novelties. The principal one among these is a set consisting of three pieces, complete with straps, designed for carrying extra tires on top of limousine bodies, which will carry



GILBERT TIRE BRACKETS.

from one to three shoes of any size desired. Each member of this set resembles in a way an inverted shelf bracket, with the portion which is fastened to the body arranged to point to the centre, and is hollowed to fit the general contour of the casing, lying on the bottom. The other casings are, of course, piled on top of the first one, and the straps across the top prevent them from being lost.

Another novelty is an adjustable tire bracket which can be arranged to carry one,



TOP BRACKET OF GILBERT TIRE HOLDER.

two or three tires without altering the main arms or running board piece by simply substituting the different necessary fingers in the arm piece and running board base. The fingers can also be changed to suit the size of the tires. These brackets are recommended by the manufacturer especially for carrying demountable rim tires or spare wheels on account of their adjustable features. Both these new tire holders come in brass.

In addition to the above they are also producing two new styles of tire cases and a new tube bag. The tire cases are made for regular casings, and also for demountable rim and spare wheel types, and come in black enameled drill and black fabric leather. One style, known as the Gilbert Diamond, is snap button fastened, with a new inner guard protection strip, and is guaranteed to be water and dust proof. The other case is known as the Gilbert Star. This case overlaps at the tread portion, and fastens by means of four draw straps, three



STEP BRACKET.

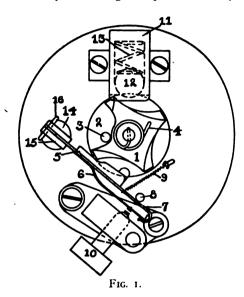
of which snap tight with buttons. This is also guaranteed water and dust proof.

The new inner tube bag is made from gum rubber cloth, with a draw string, and holds one tube of any size.

#### Rhoades Unit Spark System.

The Altemus Manufacturing Company, Forty-second and Chestnut streets, Philadelphia, Pa., who have been manufacturing ignition specialties for a considerable number of years, have recently come out with a new ignition system operating on the unit spark principle. The device comprises a spark generator and a distributor which are combined in a single unit of cylindrical form, measuring 23/4 inches in diameter by about 5 inches in length over all. The halftone shows the general view of the device, and the two line cuts illustrate the construction of the spark generating and distributing mechanism. Disc 2, carrying the post 3, is rigidly secured to the shaft A on a shoulder immediately above the phosphor bronze bushing E. A hardened tool steel cam I is fitted above this shoulder, free to move on the shaft, but held normally against post 3 by means of coiled spring 4. When the shaft moves forward each prong on the cam I is momentarily held by ball 12, which is actuated by spring 13 in the cylinder 11. During this interval

post 3 moves forward and pushes the cam over the centre of the ball, at which point the spring 4 becomes operative and snaps forward cam 1 a sufficient distance to allow another prong to wipe across tool steel block 5 on lever arm 7, causing the platinum spring tip 6 to make contact with the adjusting screw 10, thus completing the circuit. By means of spring 9 lever 7 is immediately drawn against post 8, thereby



quickly interrupting the current and producing a spark. The moment the contact is broken the high tension current generated in the coil passes through the terminal K to the brass ring I which encircles the distributing drum H and through fan J to one of the plug terminals L in the case G. The cams are so formed that on the reverse movement they cut under block 5 and raise lever 7 vertically out of contact.

It will be seen that the high tension distributor is located in the lower part of the casing and the contact or spark generating device in the upper part. All the bearings

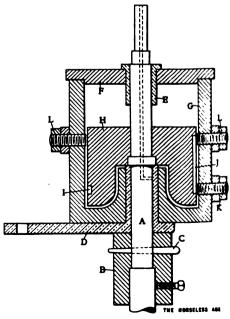


FIG. 2-RHOADES UNIT SPARK SYSTEM

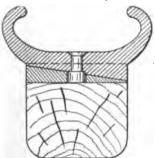


RHOADES UNIT SPARKER.

of the device are made of phosphor bronze. Among the advantages claimed for the system are simplicity, great current economy, case of starting by means of a button on the coil, absence of delicate adjustments, compactness, ease of fitting to any car, and absolutely correct timing. It is claimed that eight dry cells will last a season. The device illustrated herewith is intended for four cylinder motors. For two cylinder motors a similar device without the distributor is furnished, which can be attached like the ordinary timer.

#### Younie Demountable Rim.

To the list of demountable rims on the market has recently been added the Younie, manufactured by the O'Gorman-Younie Company, of Portland, Ore. To a common wheel is shrunk a ring or rim which has a lateral taper, and is secured in place on the felloe by tire bolts. The tire rim is provided on its inner circumferential face with a lateral taper, corresponding with the taper of the wheel rim, and is held in



THE HORSELESS AGE
YOUNIE DEMOUNTABLE RIM.

place on the wheel rim by means of two radial dowel pins, the heads of which are inserted into correspondingly located holes in the wheel rim, and by the heads of a series of clamping bolts. The clamping bolts are inserted through holes in the felloe of the wheel. The bolt heads are sufficiently large to overlap the rim of the felloe, and this arrangement would hold

the tire rim in place if, by accident, the dowel pins should be broken off, or even if the rim bolts connecting the taper rim to the felloe should get loose.

It will be noted that the tighter the tire rim is drawn on the beveled rim of the wheel the more rigid the wheel becomes as a whole. The rim is not wedged in place on the wheel rim, but is drawn upon the beveled face of the latter, and the tightening of the nuts on the draw bolts will move the tire rim up the inclined plane of the wheel rim. The tire comes off and is put in place as a part of the tire rim.

#### Triplex Radiator.

A new radiator of foreign design is being shown by Mr. Gilliard, of 39 Union square, New York city, agent for Megevet & Co., of Switzerland. The radiator is known as the Triplex, since it embodies a radiator, a pump and a fan all in one. Patents have been granted in Europe and America fully covering the several features and their combination. Owing to the peculiar construction of the Triplex it can be placed in any position on the car, in front, in the rear or in the centre, as may be desired. Owing to this fact, its light weight, and that it stirs up the air itself instead of depending on the air being forced through, as in ordinary radiators, it is especially adapted for use on racing cars, air ships and aeroplanes, and can also be used as a steam condenser. The radiating surface is composed of twelve fan blades radiating from a common centre, each blade being composed of eighteen copper tubes, with a distributing manifold at the centre and a collecting manifold at the outside which carries the water back to the centre again. The hot water coming out of the motor is led to the centre of the shaft of the

radiator, from which it is thrown by centrifugal force through the tubes of the fan blades from the distributing mani. fold, while a plain gear pump located in the centre of the radiator draws the water back from the collecting manifold through a single pipe to the reservoir which forms the circumfer-1 ence of the radiator. This reservoir can be made any desired The shaft is shape. a tube over a tube and is carried on annular ball bearings with double stuffing boxes on both ends, and can be driven either by belt, chain or bevel gears.



RAMBLER LAMP.

#### Rambler Special Lamp.

A distinctive feature of the new Rambler for 1910 will be a Rambler lamp of special design, as here illustrated. The top of the lamp is shaped to include the Rambler spare wheel in relief.

#### New Steering Wheel Watch Case.

This watch case is made of polished brass; it will hold an ordinary watch, and can be fastened to the nut in the centre of the steering wheel by simply tapping a quarter inch hole and screwing the case on with a screw furnished with the case. The bottom is cup shaped so as to fit tightly over any style of nut, or it can be screwed to one of the arms of the spider near the rim of the wheel. In either position it is always within easy sight of the driver. The cover or retaining rim screws off, which permits of the removal of the watch when desired. This device is sold by the Garage Equipment Manufacturing Company, of Milwaukee, Wis.



MEGEVET RADIATOR.

### COMMENTS AND QUERIES OF READERS.

# Wire Gauze Screens-Engine Braking.

Editor Horseless Age:

In the last issue of your valued paper (November 17), under the heading of "Comments and Queries of Readers," "A. L. M." asked regarding the result of inserting a wire gauze in the inlet pipe. In connection with this, the writer may say that, while conducting experimental work for one of the larger manufacturers, he had a few cases where the carburetor apparently gave rise to eddy currents which caused liquid gasoline to be carried with the vapor into certain cylinders only. By placing a gauze between the flanges of the carburetor and intake pipe the liquid particles were evidently broken up and the same quality of mixture delivered to each of the four cylinders.

That the gauze will in most cases prevent popping back into the carburetor there can be no doubt, but the writer never sees the statement made that "flame will not pass through fine wire gauze" without wishing to offer a word of caution. Upon several occasions he has had flame pass through gauze which was by no means hot. On one of these occasions it caused an explosion which sent his assistant to the hospital and narrowly failed sending him to his grave.

It may also be of interest to note that upon one occasion where a gaseous mixture was ignited above four thicknesses of gauze which practically touched each other the top three pieces were fused in places, and yet the fourth layer prevented further travel of the flame.

Regarding the query of "B. B. H." as to the advisability of throwing out the clutch when nearing "bad crossings or water breaks in the road," it might seem that he had taken the article advising the use of the engine for braking to mean that there was no occasion for removing the clutch under the conditions which he mentioned. He should remember that the clutch is withdrawn because, in going over a water break or bad crossing, there is a very sudden fluctuation in the rate at which the parts rotate. If the clutch is left in, the transmission parts are severely strained in trying to transmit this variation of speed to the engine. An excellent article concerning this point appeared in THE Horse-LESS AGE for March 20 and 27, 1907. Here it was shown that in traversing a "thankyou-ma'am" the propeller shaft will, if all the transmitting parts are rigid, be thrown as much as 50 degrees to either side of the position it would occupy if running at constant speed. If running with any other than direct drive, the variation in the position of the clutch would be increased in proportion to the speed reduction. With the clutch withdrawn the strain on the differential and parts is severe, but when the clutch is left in it must be that either the clutch or wheels must slip or some of the transmitting parts must bend or break. That they do not more often do the latter is really surprising, when one considers the stresses that the parts are called upon to withstand.

M. R. Wells, M. E.

### Substitution of Graphite for Talc in Tires.

Editor Horseless Age:

We note Mr. Max's communication in the November 10 issue of THE HORSELESS Age regarding the use of flake graphite in tires. We would advise that flake graphite be used in tires the same as talc, that is sprinkled in between the shoe and inner tube. We would also call attention to the practice, as pointed out by Mr. Max, of rubbing as much flake graphite into the rubber (both the shoe and inner tube) as possible. Perhaps the very best results would be obtained by rubbing the graphite into the rubber if this was done systematically and thoroughly, but, as this would take some little time and as good results are obtained by dusting flake graphite into the rubber, we recommend this method for severe conditions only.

Graphite is marketed in both the large flake and small (or fine) flake forms to meet various conditions. Where graphite is to be used on tires, we recommend the finer form.

Graphite is absolutely inert and is unaffected by acids or alkalies, and there need be no apprehension in regard to graphite injuring rubber. If one will examine a piece of rubber packing, it will be found to be filled with flake graphite which has been added in order to obtain the desired lubrication.

JOSEPH DIXON CRUCIBLE COMPANY.

L. H. SNYDER.

#### Responsibility of Repairers.

Editor Horseless Age:

I have been a subscriber for your paper for the last four years. I recall, under Legal Notes, a decision which was handed down from the Supreme Court of New York in relation to the overhauling of a machine. The garage people, having rendered the bill to the owner for the work, were unable to collect the bill, owing to the fact that the machine broke down shortly after the machine was repaired. Will you please send me the particulars of this suit?

W. H. Brown.

[The case to which you refer is undoubtedly that of Wyckoff, Church & Partridge, plaintiff, vs. August Heckscher, defend-

ant, which was decided by Justice Lauer in the Municipal Court of the City of New York, Borough of Manhattan, Third District, in November, 1908. The action was brought to recover the sum of \$267.12 for certain repairs made to an electric vehicle and new parts furnished for same. The understanding between the parties had been that the car should be put in good running condition. After the repairs were made the car was run to Huntington, L. I., only a short distance from New York city, when it was unable to proceed farther, and when it was attempted to recharge the batteries it was found that there was an open circuit, due to the breaking off of some of the leads on the storage battery plates. In his opinion the judge says: "I do not think it can be said that the plaintiff has reasonably complied with its contract to put the car in first class, or even in good running condition. So far, therefore, as the item of \$160, the contract work, is concerned, I have concluded that the plaintiff must fail in its recovery."—ED.]

#### Flat Wearing of Friction Wheels— Screens in Inlet Pipes.

Editor Horseless Age:

In your issues of November 17, page 569. "Student" asks for the advantages and disadvantages of the friction drive. Do you not consider the tendency of the drive wheel to flatten when trying to start in a tight place serious? A concentric clutch, if the wheels are positively locked, in slipping wears round, but a friction wheel flattens, the same as a locked car wheel, as you must be aware, and in the hands of an inexperienced driver who speeds up his motor and throws in his friction this happens quickly.

Referring to the inquiry of "A. L. M." on page 568, in the issue of November 17, in re gauze in the intake pipe, is not your recommendation, "Keep your carburetor properly adjusted," in the nature of the mushroom test, "Eat it and if it kills you it is a toadstool, otherwise a mushroom"? Is not the proper answer to advise a clean pan to avoid back fire danger, inasmuch as the only ready means of determining the mixture is to adjust down? I have had as many as four or five fires in a single week in cold weather in experimental driving, my carburetor being adjusted to run my motor clean when hot, then when I primed and flooded to start cold, back it came, sometimes a flame a foot long, outside the C. E. L. carburetor.

[The tendency of friction wheels to wear flat when slipped in starting from rest is covered by the lack of positiveness which we mentioned in our reply. If much trouble is experienced from this cause, we would

consider the fault to lie with the driver rather than with the system of drive. Your suggestion that we should have advised our other correspondent who inquired about the expediency of placing a gauze screen in his inlet pipe, to keep his pan clean, is rather off the mark. How do you know that he has a pan on his car? We do not admit that our advice is in any way a parallel to the suggested test for mushrooms. Our correspondent was not complaining about his car catching fire, but what he seemed to desire particularly was to gain power and save fuel. This we do not believe he can do by means of the gauze screen. The advice to keep the mixture properly dosed may be difficult to follow under certain conditions, but if the mixture is properly dosed and in a fairly homogeneous state, the screen cannot influence the fuel economy for the better. If a screen is to be used at all, we would recommend that it be placed over the mouth of the air inlet.—ED.]

### Applying Brake With Clutch In.

Editor Horseless Age:

In running down hill with the throttle closed and the spark retarded, is it proper, where the car speed increases, to apply the brake without throwing out the clutch?

W. L. P.

[We presume that the throttle on your car can be only partially closed, so that a charge still enters the cylinders and the motor keeps on exploding. In that case it would not be advisable to apply the brake while the clutch is in, as the motor would be working against the brakes, and the latter would have much more work to do in keeping the car from increasing in speed than if the clutch was first withdrawn. The best plan is to first cut off the ignition, when the motor will act as a brake and either hold the car in check itself or assist the brakes in doing this.— Ed.]

# Electric Lamps and Dynamo Voltage.

Editor Horseless Age:

I have a governed dynamo, storage battery and automatic cut-out system which I wish to install in a car to run electric lamps for the headlights while the dynamo is charging the battery. The instructions say: "When using electric lights with our system, connect same to battery terminals or wires leading thereto." Supposing a 6 volt battery to be used, what will be the voltage of the lamp circuit? Will it be 6 volts or will the dynamo, whose voltage may be as high as 15, raise it higher? Would it be safe to connect the dynamo up in place of the battery and turn the switch to indicate "Battery Volts" in order to find out the voltage of the dynamo at dif-J. T. L. ferent speeds?

[When the dynamo is connected to the battery and the battery is charging, the voltage at the battery terminals will be somewhat higher than when the battery is simply supplying current to the lamps, but it can never be very much higher, for the reason that an excess of several volts in the dynamo voltage over the voltage of the battery would cause the battery to draw a very heavy current from the dynamo, and this current would react upon the dynamo and lower the voltage. The fact that the dynamo generates as high as 15 volts when running free is not an indication that it will generate an excessive voltage when connected to the battery. You should not connect the lamps to the dynamo without having the battery connected, as the battery acts as a regulator.—ED.]

### Central Location of Control Devices.

Editor Horseless Age:

In your recent editorial on "Left Side Control" you overlooked my pet idea, viz., central control operable from either side. This solution is perfectly practical for light vehicles. Ever since motor vehicles have been marketed the buying public have been expressing a preference for one side or the other. It was to meet their requirements that I designed and made the one-hand central control a dozen years ago, which is pronounced by those who still use it "the handiest ever." Last year Holsman fitted some of his motor buggies with central control and is fitting more this year, I believe, while my buggyauts are being fitted that way in a rapidly increasing proportion. It is particularly liked by the ladies, for it keeps the control levers and pedals in the centre of the rig, where they do not catch and tear clothing as the driver dismounts. It is particularly advantageous in teaching the use of the auto, for the timid passenger will often take the control for a short while "just to see how it goes" when this can be done with little or no trouble. It tends to make drivers of every member of the family, and this is as it should be.

Along this line our legislation should be amended. In many States every driver must take out a license. Lack of licenses limits the use of the auto to one or two members of the family. Police purposes can be fully served by registering the vehicle only and making its owner responsible for all who drive it. Then any member of the family would feel free to use it. Makers want the markets increased, and the associations cannot do better than work for less restrictive legislation.

CHAS. E. DURYEA.

#### Estimate of Next Year's Production.

Editor Horseless Age:

Will you please give an estimate of the number of cars the following firms claim they will manufacture for 1910: Brush, Buick, Cadillac, Cameron, Chalmers, Ford, Hudson, Maxwell, Metz, Mitchell, Cleveland, Reo, Studebaker (20, 30, 40), etc.? Also the number of high wheel or buggy autos combined? Please state the number of firms

that will make cars for 1910, and the entire output that they plan on making? Please explain the correct method of estimating horse power? Some machines are rated at 25 to 30 horse power by makers, while the A. L. A. M. rating is 22.5.

Louis H. Hillis, M. D.

[We have circularized the above mentioned firms and find that they plan to produce cars in the following numbers for next year: Brush, 10,000; Buick, 40,000; Cameron, 1,000; Maxwell, 15,000; Mitchell, 6,000; Overland, 20,000; Reo, 8,000; Studebaker, 25,000 "Twenties," 15,000 "Thirties" and 1,000 "Forties." The Chalmers-Detroit Motor Company prefer not to make a statement. The others mentioned in your letter have not replied. We are not gifted with prophetic powers and are unable to state either the number of manufacturers who will make cars for 1910 or the number they will make. This applies equally to motor buggy manufacturers and production. There is no "the correct method" of estimating the horse power of gasoline motors. There are a considerable number of formulas and some of them give higher values than the A. L. A. M. formula, but there is not one that is universally recognized as the best or most nearly correct. Presumably the manufacturers arrive at the horse power of their motors by tests and not by formulas or estimates.—ED.]

# Centrifugal Action on Charge in Rotary Cylinder Motors.

Editor Horseless Age:

I notice in your November 10 issue, page 537, that you state that the gasoline has to enter the cylinders of the Gnome motor against centrifugal force. Will you kindly explain how this can be possible? The motor not being shown in section, it is extremely difficult to understand your explanation.

W. F. COOPER.

[It was our correspondent who stated that the fuel had to enter the motor against centrifugal force, and the statement was not made by us. We presume that what our correspondent referred to was that since the inlet valves are in the head and the suction is from the outer end of the cylinders inward the charge must flow against the action of centrifugal force into the cylinder.—ED.]

#### Benzol.

Editor Horseless Age:

In a report on some fuel tests in THE HORSELESS AGE some time ago it was mentioned that benzol could be bought at 5½ cents per gallon by the drum. Kindly advise me where it can be obtained, as I am interested in fuel tests, and especially in new fuels.

CHAS. E. LESHER.

[We believe that you are mistaken in regard to the price mentioned in connection with benzol. In an article by Mr. Clough on "Some Road Tests of Cheap Fuels" (Vol. XXII, p. 544), it was stated that crude benzol sold at 12½ cents per gallon in the drum. Mr. Clough informs

us that he thinks this figure has been quoted for benzol in large quantities to gas companies for the enrichment of their gas. One of the largest manufacturers of benzol is the Barrett Manufacturing Company, of Philadelphia. Eimer & Amend, a large New York wholesale drug house, quote a price of \$8.50 for a 10 gallon can. This latter is the refined product. The crude benzol can be bought considerably cheaper.—Ep.]

# Left Hand Control Extensively Used on Electrics.

Editor Horseless Age:

Notice with interest your article on page 559, November 17 issue, regarding left hand control. There is one point that most of the men interested in this subject have overlooked. That is, practically all of the electric machines manufactured today have been driven from the left hand side. This was done so as to permit the operator to use his right hand in steering the car.

In no instance have the complaints to the manufacturer of electric machines been serious, and there has been very little trouble in the operators locating the curb or any other object in the road. Personally I believe that the steering on the left hand will ultimately be the most popular.

A. C. Downing.

### Specific Gravity of Denatured Alcohol Solution.

Editor Horseless Age:

Will you kindly let me know what specific gravity should be used in a solution of denatured alcohol and water to prevent freezing in regions about New York city?

O. H.

[A denatured alcohol solution of 0.95 sp. gr. will stand zero weather, and gives undoubtedly sufficient protection, except in long continued spells of severe cold. A solution of 0.925 sp. gr. will withstand 15 degrees below zero Fahrenheit.—Ep.]

### Cubical Horse Power Formula. Editor Horseless Age:

Please inform me through the columns of your periodical how the horse power of an engine is found when the capacity in cubic inches is given, as, for example, in the recent account of the Atlanta races. M. B.

[The way stock cars are generally rated, one horse power is produced for each 10 cubic inches of piston displacement, as an average; consequently, dividing the piston displacement by 10 should give you the approximate horse power. This rule gives the same result as the A. L. A. M. formula when the stroke is about 5 inches. If the stroke is less it gives smaller values; if more, larger than the A. L. A. M. formula.—Ep.]

Both the National Association of Automobile Manufacturers and the American Motor Car Manufacturers' Association held meetings in New York Tuesday.

# Worcester Endurance Contest December 17.

The Worcester (Mass.) A. C. has fixed the date for its annual endurance run for December 17. The rules will be practically the same as last year and will be issued in a few days. An arrangement has been made with the Worcester Polytechnic Institute for making tests at the laboratory of the institute to determine the horse power developed by the cars at different speeds and on different grades, the drawbar pull, etc. The following technical committee has been appointed: C. M. Allen, chairman; David L. Gallup, in charge of the laboratory tests, and I. C. Harvey. Institute students will act as observers.

#### Sixteen Hundred Mile Winter Run.

A Jackson car, driven by E. P. Blake, of Boston, and Charles Percival, of New York, made a trip from Jackson, Mich., to Bangor, Me., last week in 123 hours' continuous driving. The distance is 1,614 miles, and was covered last year by the same parties in two days, twelve hours, and forty-five minutes more than the new record time. The car carried 300 pounds of baggage and supplies.

#### Free Air at Tire Stores.

The Fisk Rubber Company some time ago conceived the idea of equipping all their branches with air boxes, which are placed on the sidewalk close to the curb, for the convenience of motorists. Upon opening a box a rubber tube is found, which is attached to the tire valve, and a lever and scale regulate the amount of pressure to which the tire is inflated. Keys to these boxes are furnished free to motorists upon request. At the New York branch the air is supplied from a rubber tube at the rear entrance, owing to the fact that the city will not permit encumbrances on avenue sidewalks, and also forbids making repairs or adjustments on the sidewalk.

#### Independent Oil Concerns Fight Award of Milwaukee Contract to Standard Oil Company.

Independent oil interests, headed by the Wadhams Oil Company, of Milwaukee, Wis., are attacking the action of the Milwaukee Board of Public Works in recommending to the Common Council that 500,000 gallons of asphaltum oil be purchased from the Standard Oil Company. The Standard's figure of .0295 per gallon is considered too high, and the independents ask that the contract be awarded by means of competitive bids. The attack will not delay the extensive scheme of treating Milwaukee streets and parkways with the dust laying preparation.

#### Alumaloyd Sheets.

A substitute for sheet iron and steel for use in the construction of automobile bodies, fenders, etc., has been brought out by the Stark Rolling Mill Company, of Canton.

Ohio, and is marketed under the name alumaloyd. Steel and iron have their drawbacks owing to the difficulty found in giving either a perfect lasting finish. The texture of the metal is such as to readily take a finish without pumice stoning, filing or sandpapering, or without the use of rough stuff, which should be an item in the cost of production. The metal comes in sheets and can be drawn, stamped, pressed, double seamed and soldered, and being scaleless and rustless it seems to be certain of a future in automobile construction.

#### Bituminous Roads for New Jersey.

Col. Gilkyson, State Road Commissioner of New Jersey, announces that in future the new roads of that State will probably all receive a bituminous pavement, instead of the heretofore common macadam pavement, which is claimed to be unequal to the wear and tear of automobile traffic. The State now has 85 miles of bituminous road, and specifications have been prepared for 13 miles more. It is claimed that the cost of the bituminous pavement is from \$1.15 to \$1.50 per square yard, as compared with \$1.90 to \$2.50 for macadam pavement. Col. Gilkyson is urging the Federal authorities at Washington to appoint a paving commission to supervise road construction on this system so as to avoid conflict with any of the patented road making processes and permit of open bidding.

#### Goodyear Tire & Rubber Company to Handle the Doolittle Demountable-Detachable Rim.

The Goodyear Tire & Rubber Company have secured control of the Doolittle demountable-detachable rim, which was described in our issue of March 10 last. This rim will take any type of quick detachable or clincher tire. It has been used in many of the important contests of the past season. In the Brighton Beach 24 hour race two of the contesting cars were equipped with Doolittle rims, and fifty-four tire changes were made, some of these in the remarkable time of 28 seconds, it is claimed, and in one case four tires were changed in the total time of 1 minute 7 seconds. Negotiations for the exclusive sale of the rims were concluded about a week ago, and the rims will shortly be on sale at all the company's branches and agencies. The rim was invented by Dr. Perry E. Doolittle, of Toronto, Canada, who also invented a number of other well known auto accessories. These rims can be fitted to any car in a few hours, the old wheels, felloes, casings and tubes being used.

The contract for carrying the mails by automobile between Newport News and Old Point, Va., for a term of years has been awarded to Frank L. Small. Mr. Small will leave Newport News at 7:15 a. m. and will arrive at Newport by 9:40, while the mail does not now arrive there before 11 o'clock.

### The International Show at Olympia, London.

eighth international automobile exn, which opened in the Olympia Build
ondon, on November 12 and closed
iber 20, bore, perhaps, the strongest
utional character of any automobile
ever held, owing to the fact that the
i manufacturers decided to hold no
at Paris this year. While the Olymow always included many products of
ontinental manufacturers, it never benjoyed the distinction of being the
bal exhibition of the year, not even
its opening preceded that of the
Salon.

epresentative international show has estimable educational value to manuers and designing engineers, as well he general public. The Olympia show ear was no exception to this rule, new original details of body, motor ear construction were shown, as well blications of old and well tried (in lines) principles.

n the layman's standpoint the most teristic features of the exhibition as le were the new style of torpedo body e remarkable decrease in motor power. in America the high powered car is still holding its own in competition with the popular priced low powered car, largely by reason of our present road conditions, the foreign manufacturer has been reducing the motor sizes until a 4 inch bore in a four cylinder motor practically represents the largest size motor used, and nearly every manufacturer had on exhibition a standard model of 85 mm. (3.4 inch) bore or less. Particularly noticeable was the absence of large four cylinder motors, these having been replaced with sizes of smaller cylinder dimensions, and the larger and heavier touring cars of the highest prices were invariably equipped with six cylinder motors.

Among the changes in motor construction the increase in the number of designs of piston valve motors was perhaps the most prominent; while there were several motors with piston valves on exhibition which owe their origin to the "Silent Knight," they all differed from the latter in having valves located similarly to the mushroom valves which they replace. It is understood, however, that several of the well known firms have taken up the "Knight" patents and intend to produce a motor along these lines.

The torpedo bodies on exhibition-and

nearly every booth showed some form or other of this type-are constructed very low, with the seats set very low in the body. This style body, with a bulging, rounded stem, is especially popular in France. One valuable feature of these bodies is the side doors in front, which are surely a protection to the driver. The side door in the driver's side is generally a dummy. On some of the cars the door is outside the operating levers, in some between the speed central lever and the emergency brake lever, and in still others it is inside both sets of levers. In connection with the above body come the adjustable seats and footboards.

The tendency to slope the tonneau seat proper is growing remarkably, while in some instances the driver's seat is also sloped. This, with a foot rest adjustable to any desired position, surely is a step in the direction of comfort for the occupants of the car. Several styles of adjustable seats for long wheel based cars, where there is plenty of tonneau room, were shown, and some particularly adapted to short tonneau cars. The most noticeable of these several seats was one which when not in use as a seat



GENERAL VIEW OF OLYMPIA MOTOR SHOW.

was convertible into a sloping foot rest, and especially adaptable to a short tonneau.

The two cycle motor has evidently not developed as rapidly abroad as one might expect, as but one new make was added this year to those formerly shown.

In clutches and transmissions very little change was observable. The principal tendency, however, is to return from the four forward speed, with direct drive on third, to the simple three speed forward type. There are one of two instances where a double direct drive is used (i. e., a direct drive on both the third and the fourth speeds). This is done by using two sets of bevel gears in the rear axle.

The Olympia Show of 1909 will go down in history as the first great exhibition at which the front wheel brake applied to standard stock chasses was shown to the public. Such brakes were shown on Sheffield-Simplex, Crossley, Arrol-Johnston and Thames cars. The principle of front wheel brakes has been much discussed in England for some years, and solutions of the problem have now evidently been reduced to practical form. While the stopping power of front brakes is no greater than that of the rear brakes, it is claimed that the tendency to skid is practically removed, and the avoidance of skidding by far overbalances the added complication in importance. This does not imply that the tires adhere any more firmly to the roadway, but rather that when the brakes are applied to the rear wheels the front wheels frequently happen to be turned slightly, and, the rear wheels being blocked, continue to travel in a straight line, while the front wheels find it easier to follow their rolling path; this if allowed to proceed develops into a "skid." The reason that the applying of brakes on the front wheel does not cause sideslipping is that when the front wheels slip the vehicle continues in a straight line.

A very large proportion of the cars this year were equipped with steel wire spoked wheels. Another noticeable fact was that all sizes of cars were equipped with magnetos, from single cylinders to sixes.

The worm driven rear axles show some improvement in the shape of the worm. Heretofore a straight worm has been mostly



Adams Chassis, Replecting American Ideas.

used on types of this kind, but a worm that conforms to the circumference of the worm gear, and thereby giving greater bearing surface, seems to be gaining in favor. This type of transmission has been used for several years on light cars by some of the foreign makers, but has been looked upon with disfavor by others who claim that the bearing surface was too slight and that the rubbing motion entailed short life. This system has been tried and abandoned by some manufacturers, but taken up by others of wide reputation. The principal objection seems to be that it is impossible to start quickly or pick up speed rapidly.

What is claimed to be the largest private car in the world was also shown. This was specially built for Mr. Du Cros, the well known promoter, at the Austin works. It is a motor "caravan," and has a well equipped kitchen, behind a salon which serves alternately as day and night apartment of the passengers. The chauffeur is to sleep on the roof under a tent.

It is needless to say that the United States was better represented at the show than

ever before. Some of the American low priced cars are also being copied by the foreign makers.

"En bloc" motors were not so much in evidence, but more unit power plants are being used than last year.

### Old Construction Idea Revived Abroad.

The French and English automobile papers have recently described a new so called frameless chassis, which has been placed on the French market under the name of Simplicia by the firm of Lacoste & Battmann, 15 Rue Danton, Levallois-Perret. This car employs a unit power plant, the change gear, clutch and crank shaft hosings being all bolted together, and this unt is connected by a large diameter tube with the driving gear housing of the rear axe The front axle is not unlike the Siraire-Naubin, being spring supported from the wheels through a semi-elliptic cross spring The forward end of the power unit is onnected to this front axle, and the rear ent. of course, is supported through the layer tube above referred to upon the rear and without intermediary springs. As far as the arrangement of the power plant and rear axle is concerned, a very similar construction was exploited in this country some for years ago by the Phelps Motor Car Conpany, of Stoneham, Mass., which company has since passed out of business.

Among the advantages claimed for this new French construction is the appearant of simplicity due to the abolition of the frame, with its numerous control consections. The control members are mounted directly upon the casings. The assembly is claimed to be perfectly rigid and non-deformable within the limits of operation of the vehicle, and there are no universal joints used, which results in an increase in the transmission efficiency. All of the camp are machined on the lathe, which insure perfect concentricity. The body is secured to the running gear at three points, and can be readily removed. The 12 horse power chassis, which has cylinders of 34 inches, weighs 1,110 pounds without both and tires, which is considered to be very light by the manufacturers.



SIMPLEX CAST ALUMINUM TORPEDO BODY.



CROSSLEY MOTOR, CLUTCH AND GEAR SET.

### AUTOMOBILE LAW AND LEGAL EVENTS.

#### Massachusetts Taximeter Law.

Below will be found the text of the Massachusetts law relating to the inspection and sealing of taximeters. This puts the taximeter and even the odometer, when used for the calculation of fare, in the same class as scales, yardsticks and liquid and dry measures, except that the sealing and inspection of these instruments is in the hands of the State and not the local authorities. This obviates the necessity of inspection in more than one town and does away with confusion as to jurisdiction. This law simply places the examination of the machines as to their accuracy in the hands of the commissioner, but does not interfere with the right of the local authorities to make such regulations as they may deem fit as to rates of fare, etc.

MASSACHUSETTS TAXIMETER INSPECTION LAW. Section 1. The provisions of chapter 62 of the Revised Laws relative to the testing and sealing of weights, measures and balances shall apply to all taximeters and other forms of measuring devices which are used upon vehicles for determining the cost of transportation; provided, that the testing and sealing of such devices shall be performed by the commissioner of weights and measures of the commonwealth and not by the sealers of weights and measures in cities and towns. All such devices shall be tested as to the correctness of measures and values indicated by them, and the commissioner of weights and measures is empowered to make such rules and regulations as he may deem necessary to insure accuracy in the use of the said devices.

Section 2. The commissioner of weights and measures shall seal the said devices when tested and found to be correct, and shall mark, condemn or seize the same if incorrect, in accordance with the provisions of said Chapter 62 applicable to weights, measures and balances, and all penalties imposed by said chapter for violation of the provisions thereof relative to weights, measures and balances shall also be applicable to the said devices.

Section 3. The commissioner of weights and measures shall collect a fee of \$1 for each device sealed under the provisions of this act, and such fees shall be paid by him monthly into the treasury of the commonwealth.

#### Rear Light Regulations.

Police Commissioner Baker, of New York, announces that he will recommend to the Board of Aldermen the passage of an ordinance requiring the carrying of a new kind of tail light on automobiles, so arranged that a metal slide in the form of stencil containing the registration numbers of the regulation size can be fastened

across the face of the light. In that way an owner could have separate slides for the different States, and thus always display his local number. Under the present law it is necessary to paint the owner's number on the lenses of the lamp, but the numbers are too small and the paint soon wears off. The Board of Aldermen, however, have no authority to pass such an ordinance, as it would conflict with the State law.

### Special Session May Clear Indiana Road Law Tangle.

Governor Marshall, of Indiana, has received a number of requests from different parts of the State for a special session of the Legislature to straighten out the road law tangle. Recently the Supreme Court held that the laws under which road construction was met by issuing bonds were invalid and road work all over the State has been stopped. It has been decided that bonds already issued under the laws are valid, but contractors fear that bonds issued in the future might be worthless. They also believe it would be practically impossible to dispose of road bonds in view of the present situation. The Governor has not indicated what he will do in the matter.

#### Road Hog's Punishment Confirmed.

An important precedent has been established by the Circuit Court at Racine, Wis.,. in affirming the verdict of the municipal court in the case of Henry Plow vs. Ernest Nowak for malicious obstruction of the highway. Mr. Plow is a member of the Mitchell Motor Car Company, of Racine, and while driving his touring car from Milwaukee to Racine last summer came upon Nowak and a companion in a horse drawn rig. Mr. Plow asked them to give him room to pass, but Nowak kept the middle of the highway for more than an hour, keeping up a snail's pace. There were steep embankments on both sides of the road, precluding possibility of passing under these conditions. Nowak was fined \$10 in the municipal court, but appealed, and he now loses again.

### State Law Rights Must Not Be Abbreviated.

Judge William B. Broomall, of Media, Pa., has handed down a decision to the effect that municipalities in Pennsylvania have no authority to pass regulations abbreviating the rights granted automobilists under the State law of April 27 last. The opinion was given in an appeal taken by Elmore F. Taylor from a conviction by a justice of the peace in Swarthmore, who had fined him \$5 and costs for disobeying a

borough ordinance requiring headlights to be displayed between sunset and sunrise. The State law requires the lamps to be burning only from one hour after sunset to one hour before sunrise.

#### Legal Notes.

The Locomobile Company of America have brought suit for \$2,000 damages against the Connecticut Company, as the outcome of an accident in New Haven on October 19 last, in which two of the company's 1910 model cars that were being tested out by road testers were damaged through a rear collision with a street car. It is alleged that the two cars were being driven one behind the other in College street, when a street car came up from behind and bumped into the rear one of the two automobiles, and the latter in turn dashed into the forward one, whereby both were almost entirely wrecked.

Harry A. Snow has brought suit for \$10,000 damages against the village of Excelsior, Minn., alleging that last summer his automobile ran into the lake near Solberg's Point. The county commissioners built a new bridge across the channel, and the village changed the road in consequence. A turn had to be made to get on to the bridge, and the old road led directly into the lake. Mr. Snow drove over the road and, not knowing of the turn, went into the lake.

The case of the Matheson Company of New York City, now the Palmer & Singer Manufacturing Company, against the Matheson Motor Car Company, of Wilkes-Barre, Pa., involving an amount of more than a hundred thousand dollars, came up in the Federal Court in Scranton on November 22. The Palmer & Singer concern formerly represented the Matheson Company in New York City, and they allege that the Matheson Company sent to them cars which had not previously been tested out, as was called for by the contract, whereby, they allege, their interests were seriously injured.

#### **Business Troubles.**

A petition asking that the Indestructible Wheel Company, of Lebanon, be declared a bankrupt has been filed in the United States Court at Indianapolis. The creditors are largely publishers of trade publications. Mayor Hoy, of Lebanon, is one of the principal stockholders in the concern, in which about \$70,000 has been invested

George P. Rowell has been appointed receiver for the Goshen Tire and Rubber Company, of Goshen, Ind., and the firm will probably be wound up. They manufacture a cushion tire, and have been in business about a year.

#### The New Orleans Meet.

Unforeseen events marred the opening of the New Orleans Automobile Club's meet at the Fair Grounds November 20 and 21. In the first place, Barney Oldfield and Kirscher were unable to race on account of the non-arrival of their cars. The cars were shipped from San Antonio on a fast train, but 50 miles from New Orleans the cars were placed on a local, and they only reached their destination late in the afternoon. Then mishaps and withdrawals in various events made it necessary to further rearrange the program. The National car, driven by John Aitken, cracked a cylinder and was unable to enter the 50 mile race, which would have made it the best race of the afternoon.

No records were broken, though the track appeared as fast as it was in February, when the last meet was held. None of the winners was pushed very hard though, and most of them wanted to nurse their cars for the second day's racing. Ray Harroun was the particular star of the first day. Piloting a Marmon car, he entered four races, captured two firsts and two seconds, including the 50 mile race. Numbers of auto parties were out at the Fair Grounds, and about two thousand people were present. The track was well oiled and dustless, and everything was primed for a good day of racing.

The first event was a match race for 5 miles between Tilford Cowell, of Montgomery, Ala., who holds the Southern amateur championship, and A. Benzie, of New Orleans, in an Oldsmobile. Cowell won easily in 7:12.

The second was a 20 mile stock car race, for cars of 301-450 cubic inch piston displacement. The prize was \$50. There were three entries: Harroun, in a Marmon; Aitken, in a National, and Basle, in a Renault. The race in the beginning was a nip-and-tuck affair. The cars were well bunched for the first 5 miles. At that

distance Basle was leading by a car length, having made 5 miles in 5:40. The first 10 miles was made in 10:55. At this point Harroun, in his Marmon, was leading by a length, the Renault having dropped back a quarter of a mile. Harroun kept his lead, and finished in 21:282-5. Aitken, in his National, was second, and the Renault brought up in the rear.

The third event, open only to Louisianians, was for a trophy put up by Governor Sanders. John Walker, of New Orleans, in a Buick, carried off the honors. He finished the 5 mile run in 36:48 3-5. Clarence Murphy, in his Ford, finished second. He started out well in the rear and adhered religiously to the city speed limit. Four cars started. Two fell by the wayside, but Murphy plodded on. His persistence caused lots of enthusiasm, though, and he was given a cheer when he finished.

Five entries were in the fourth race, a to mile handicap. Harroun, in his Marmon, and Aitken, in his National, were handicapped at scratch. Basle, in a Renault, was given 30s.; Colwell, in a Chalmers-Detroit, was given 45s., and Walker, in his Buick, was allowed 1:10. Basle soon got the lead and kept it. He won in handy fashion in 10:52. Harroun was second and Aitken third.

As the crowd began yelling lustily for Barney Oldfield to show that he was really at the track, he climbed into Harroun's car and took it around the track for a mile, clipping the distance in 1:04.

A 5 mile free for all event, the fifth race, was between Basle in a Renault, Aitken in a National, and Harroun in his Marmon. The race was from a standing start. Aitken won in 5:251-5. Harroun was second.

The 50 mile race was reserved for sixth place. There were two classes, Class 2 for cars of 301 to 450 piston displacement, and Class 4 for cars of 161 to 230 piston displacement. In the first named class Basle,

in a Renault, and Harroun, in a entered. In Class 4, Colwell, in a 6 Detroit, was the only entry. T were \$50 to the winner and \$25 the first in each class.

At the end of to miles, which in 10:53, the Marmon led. Rer second and the Chalmers-Detroit third. On the eleventh mile the tank of the Chalmers-Detroit ca a leak, and Cowell stopped to he paired. While making the sixte the Renault blew a tire and was The Chalmers-Detroit started miles behind the leader, the Marn Marmon had a clean field and wa as smoothly as clockwork, never an instant the whole time. It ma miles in 27:09 1-5, 35 miles in 38:1 40 miles in 43:50 1-5. The 50 mile in 54:06 3-5. The Renault was th forty-first mile and the Chalme on its thirty-fifth mile. The Cha troit had to stop again because trouble, and when the Renault fi race Referee Wagner called the The Chalmers-Detroit was just thirty-ninth lap.

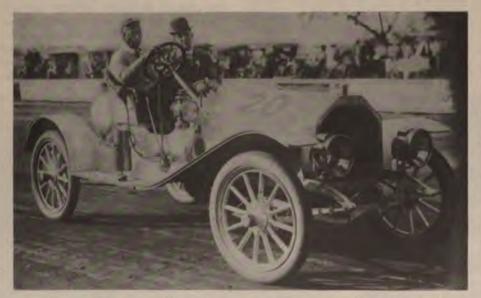
The second day's racing was be the first. More cars were enter time was made, and there was attendance. Barney Oldfield, deadrivers, succeeded in breaking the ord broken during the two days' lowered the Fair Grounds' track a mile. He made the circuit in a flat, clipping off one-fifth of a see the record established last Fel Ralph De Palma. Oldfield's big seemed to fly around the track, the record was announced the cr wild. Barney was the hero' of the

The second day's races were with the greatest dispatch, one is hardly finished before another will Referee-starter Fred Wagner as Abbott, clerk of the course, wer mented on the way they kept this ing.

A 10 mile handicap was the filt was for a \$50 prize. There wentries, Basle, in a Renault, with onds handicap; Aitken, in a Nation 25 seconds handicap; Harroun, in mon, and Kirscher, in a Durac scratch. The event was close, being ly contested throughout. Kirscher, Darracq, finished first in 10:55; Aith second, Harroun third, and Basle in

The second event was a trial again world's record of 48:40 2-5 for 50 m Barney Oldfield in his Benz. He was after every record up to 50 miles. He as a tire on his eighteenth mile, howen gave up the trial. He made the firm of the eighteenth in 55 seconds, the miles in 4:40, 10 miles in 9:21, and 35 in 14:04. Up to the time he burst he seemed to stand a good chance of up a new record for 50 miles.

Five miles for the Southern du ship, open only to amateurs and cha



JOHN WALKER, DRIVER, AND HOMER GEORGE, SECRETARY OF THE NEW ORLEANS AUTO-MOBILE CLUB, IN BUICK WHICH WON THE NEW ORLEANS CHAMPIONSHIP.

event. It was won by Presi-Campbell, of the New Orleans National car. Speer drove. is for a trophy offered by the Railway and Light Company. irted, a Thomas 40, driven by ; a Chalmers-Detroit, driven Cowell; a Buick 17, driven by ; a Marmon, driven by Swo-National, in charge of Speer. car withdrew after the third others all finished. The pace he National and the Marmon, o fought it out the whole way. nt the National across in 5:30. event was furnished by Barwhen he went after the track mile in his big German Benz. empt was two-fifths of a secthan the record made by De t February's meet.

fresh cigar between his teeth, after the record again. He e corners this time and opened he result was that he clipped of a second, making the circuit s flat.

asle won the fifth event, a 10 all, in his Renault. He made in II:21. Five cars entered. andicaps they were: Renault 5 handicap; Darracq (Kirsch-Marmon (Harroun), 40 seconal (Aitken), 35 seconds; troit (Cowell), 1:40. The cars at order also.

th event the Buick again demrunning ability. The race was nile New Orleans championcars owned in that city and or Behrman trophy. The same won the Louisiana championt day won again, and it was by John Walker. It ran away e, winning in 6:15. The car by the Joseph Schwartz Com-

oth race, the special 5 mile en Barney Oldfield in his Benz scher in W. H. Pickens' Dare of the features of the afterrace was from a flying start. eaped across the line at full right together. Kirscher had kept it the whole time. The p and tuck, and Oldfield only width of a tire. The finish many of the spectators thought ad heat until the judges anferently. Ben Kirscher was his country from Germany by ns as a driver for his Darracq. ame a favorite with the specis a careful driver, nurses his d knows how to get out all of ere is in it.

event was the concluding race. by Harroun, of Chicago, in his ohnny Aitken, in his National, ed like a sure winner. For 80 the pace and had a mile lead mon. Then suddenly ignition



BARNEY OLDFIELD IN HIS BENZ AFTER LOWERING FIFTY MILE LOCAL TRACK RECORD.

trouble developed and he had to withdraw. Harroun drove a magnificent race, going the whole 100 miles without a stop. He experienced neither tire nor engine trouble. It was one of the most consistent exhibitions of driving of the meet. Charles Basle, in his Renault, finished second to Harroun in the Class 2 division of this race, which called for cars of piston displacement of 301 to 450 cubic inches.

Tilford Cowell, of Montgomery, Ala., entered his Chalmers-Detroit in Class 4, piston displacement of 161 to 230, being the only entry in that class. As he was on his ninety-second mile when the Renault finished third, and it was getting dark, the race was called off, but he was given first place in his class.

Ray Harroun proved the most consistent winner of the two days' racing. He won three races and finished second twice out of seven starts.

Chicago M. C. Tickets. The Chicago Motor Club will hold its election on December 18, and two tickets have been placed in the field as follows:

Ticket No. 1 .- For president, David Beecroft; first vice-president, Thomas J. Hay; second vice-president, A. J. Banta; secretary, Frank H. Trego; treasurer, H. T. Clinton. Directors-Charles P. Root, C. G. Sinsabaugh, G. B. Stiger, F. M. Sparks and O. G. Temme. Auditing committee-S. B. Comstock, C. S. Winslow and N. H. Van Sicklen, Jr.

Ticket No. 2.-For president, N. H. Van Sicklen, Sr.; first vice-president, Frank H. Martin; second vice-president, Louis Geyler; secretary, C. A. Tilt; treasurer, F. A. Case. Directors-Charles E. Grerory, E. A. Hearne, Joseph Deibler, J. P. Frisby and E. Q. Cordner. Auditing committee-G. S. Chapin, Harry W. Cooper and F. J. Robinson.

#### Ohio Good Roads Federation Headquarters in Columbus.

The good roads movement in the Buckeye State will soon be centred in Columbus when the Ohio General Assembly begins its sessions, early in the new year. The headquarters of the Ohio Good Roads Federation, of which M. M. Maxwell is secretary, will be removed from Cleveland to Columbus, and many of the officers will urge the Legislature to enact several highway measures which are needed to carry forward the improvement of the State's highways. The federation was organized in Columbus about a year ago chiefly through the efforts of George W. Lattimer and A. H. Huston, the latter being made president at the recent annual meeting. After a year's trial it is found that the work can be handled better from Columbus than from Cleveland. Much is expected of the Legislature this winter.

#### Connecticut Charter for A. A. A.

Charles Thaddeus Terry, chairman of the legislative board, has taken steps to dissolve the A. A. A. as a corporation, under the laws of New Jersey, and application will be made for a charter under the laws of Connecticut, as a membership organiza-

Commenting on the proposed change, Mr. Terry said:

"The plan for a membership organization under the laws of Connecticut will meet and overcome every criticism made during the last four or five years regarding the failure of the organization to give proper representation to the various automobile organizations throughout the country. Under the new plan every affiliated organization will have full representation on the board of directors, and its interests will thereby be fully protected. The old plan of stock holding will be entirely eliminated. There will be no stock whatever under the new conditions, and therefore no proprietary interests. A membership organization, such as is proposed, will afford the best possible working machinery for such a body as the American Automobile Association. The plan will not be so different from the one under which the national body has been working as to disturb the routine of the organization."

Muncie Gear Works, Muncie, Ind.

field, N. J.

National Carbon Co., Cleveland, Ohio.

Oliver Manufacturing Co., Chicago, Ill.

Pantasote Co., 11 Broadway, New York.

#### Grand Central Palace Exhibitors.

AUTOMOBILE EXHIBITORS. Allen-Kingston Motor Car Co., 1934 Broadway, New York. American Motor Car Co., Indianapolis, Ind. American Motor Co., Brockton, Mass. American Motor Truck Co., Lockport, N. Y. Atlas Motor Car Co., Springfield, Mass. Bartholomew Co., Peoris, Ill. B. C. K. Motor Co., York, Pa. Black Manufacturing Co., Chicago, Ill. Bowman Automobile Co., 225 West Forty-ninth street, New York. Brewster & Co., Broadway and Forty-seventh street, New York. Brush Runabout Co., Detroit, Mich. Buckeye Manufacturing Co., Anderson, Ind. C. G. V. Import Co., 49 West Sixty-fourth street, New York. Cartercar Co., Pontiac, Mich. Cameron Car Co., Beverly, Mass. Chadwick Engineering Works, Pottstown, Ps. Chase Motor Truck Co., Syracuse, N. Y. Coates-Goshen Co., Goshen, N. Y. Columbus Buggy Co., Columbus, Ohio. Crawford Automobile Co., Hagerstown, Md. Dayton Motor Car Co., Dayton, Ohio. De Dion-Bouton Selling Branch, 1649 Broadway, New York. Delahaye Import Co., a Rector street, New York. Demotcar Sales Co., Detroit, Mich. Empire Motor Car Co., Indianapolis, Ind. Fal Motor Co., Chicago, Ill. Fiat Automobile Co., 1786 Broadway, New York. Ford Motor Co., Detroit, Mich. Gaeth Automobile Co., Cleveland, Ohio. Grabowsky Power Wagon Co., Pontiac, Mich. Gramm-Logan Motor Car Co., Bowling Green, Ohio. Hart-Kraft Motor Co., York, Pa. Henderson Sales Co., Indianapolis, Ind. Holsman Automobile Co., Chicago, Ill. Hol-Tan Co., 1741 Broadway, New York. Hotchkiss Import Co., 1855 Broadway, New York. Hupp Motor Car Co., Detroit, Mich. Inter-State Automobile Co., Muncie, Ind. Isotta Import Co., 1623 Broadway, New York. Jackson Automobile Co., Jackson, Mich. Jewel Carriage Co., Carthage, Ohio. Kissell Motor Car Co., Hartford, Wis. Lansden Co., Newark, N. J. Lion Motor Car Co., Adrian, Mich. McCue Co., The, Hartford, Conn. McIntyre Co., W. H., Auburn, Ind.
Mack Brothers Motor Car Co., Allentown, Pa. Martin Carriage Works, York, Pa. Maxwell-Briscoe Motor Co., Tarrytown, N. Y. Metz Co., The C. H., Waltham, Mass. Metzger Motor Car Co., Detroit, Mich. Middleby Auto Co., Reading, Pa. Midland Motor Co., Moline, Ill. Mitchell Motor Car Co., Racine, Wis. Moline Automobile Co., East Moline, Ill. Moon Motor Car Co., St. Louis, Mo. Mora Motor Car Co., Newark, N. J. National Motor Vehicle Co., Indianapolis, Ind. Nordyke & Marmon Co., Indianapolis, Ind. Oakland Motor Car Co., Pontiac, Mich. Otto Sales Co. (W. S. Jones), 5144 Wayne avenue, Philadelphia, Pa. Paige-Detroit Motor Car Co., Detroit, Mich. Palais de l'Automobile, 1786 Broadway, New York. Panhard & Levassor, Broadway and Sixty-second street, New York. Patterson Co., W. A., Detroit, Mich. Pennsylvania Auto Motor Co., Bryn Mawr, Pa. Pierce Motor Co., Racine, Wia. Premier Motor Manufacturing Co., Indianapolia, Randolph Motor Car Co., Chicago, Ill. Rapid Motor Vehicle Co., Pontiac, Mich. Regal Motor Car Co., Detroit, Mich. Reliance Motor Truck Co., Detroit, Mich. Renault Frères Selling Branch, 1776 Broadway, New York. Reo Motor Car Co., Lansing, Mich. Saurer Motor Trucks (A. T. Otto), 1876 Broadway, New York.

Schacht Manufacturing Co., Cincinnati, Ohio. Seitz Automobile and Transmission Company, Detroit. Mich. Siplex Motor Car Co., Mishawaka, Ind. Speedwell Motor Car Co., Dayton, Ohio. St. Louis Car Co., St. Louis, Mo. Staver Carriage Co., Chicago, Ill. (Streator) Grant Square Automobile Co., 1378 Bedford avenue, Brooklyn, N. Y. Sultan Motor Car Co., 1659 Broadway, New York. York Motor Car Co., York, Pa.

Pennsylvania Rubber Co., Jeannette, Pa. Pittsfield Spark Coil Co., Dalton, Mass. Randall-Faichney Co., Boston, Mass. Remy Electric Co., Anderson, Ind. Republic Rubber Co., Youngstown, Ohio. Royal Equipment Co., Bridgeport, Conn. Sager & Co., J. H., Rochester, N. Y. Shaler & Co., C. A., Waupun, Wis. Smith Co., A. O., Milwaukee, Wis. MOTOR AND ACCESSORY MANUFACTURERS. Spicer Universal Joint Manufacturing Co., Plain-Ajax-Grieb Rubber Co., 1776 Broadway, New York. Splitdorf, C. F., 1679 Broadway, New York. American Ball Bearing Co., Cleveland, Ohio. Sprague Umbrella Co., Norwalk, Ohio. American Electrical Novelty and Manufacturing Standard Roller Bearing Co., Philadelphia, Pa. Co., 308 Hudson street, New York. Standard Welding Co., Cleveland, Ohio. Atwater Kent Manufacturing Works, Philadelphia, Pa. Atwood-Castle Co., Amesbury, Mass. Auto Improvement Co., 316 Hudson street, New York. Badger Brass Manufacturing Co., Kenosha, Wis. Baldwin Chain and Manufacturing Co., Worcester, Mass. Batavia Rubber Co., Batavia, N. Y. Bowser & Co., S. F., Fort Wayne, Ind. Breeze Carburetor Co., Newark, N. J. Briscoe Manufacturing Co., Detroit, Mich. Brown-Lipe Gear Co., Syracuse, N. Y. Byrne-Kingston & Co., Kokomo, Ind. Cose Wrench Co., L. C., Boston, Mass.
Coes Wrench Co., Worcester, Mass.
Columbia Nut and Bolt Co., Bridgeport, Conn.
Consolidated Rubber Tire Co., 20 Vesey street, New York. Continental Caoutchouc Co., 1788 Broadway, New York. Cook's Sons, Adam, 313 West street, New York. Cramp & Son, Wm., Philadelphia, Pa. Dayton Rubber Manufacturing Co., Dayton, Ohio. Diamond Chain and Manufacturing Co., Indianapolis, Ind. Diamond Rubber Co., Akron, Ohio. Deitz & Co., R. E., 60 Laight street, New York. Dixon Crucible Co., Jos., Jersey City, N. J. Edmunds & Jones Manufacturing Co., Detroit, Mich. Electric Storage Battery Co., Philadelphia, Pa. Empire Tire Co., Trenton, N. J. Excelsior Motor and Manufacturing Co., Chicago, T11. Firestone Tire and Rubber Co., Akron, Ohio. Fisk Rubber Co., Chicopee Falls, Mass. Fox Metallic Tire Belt Co., 19 McKibben street, Brooklyn, N. Y.
G & J Tire Co., Indianapolis, Ind. Gabriel Horn Manufacturing Co., Cleveland, Ohio. Gemmer Manufacturing Co., Detroit, Mich. Gilbert Manufacturing Co., New Haven, Conn. Goodrich Co., B. F., Akron, Ohio. Goodyear Tire and Rubber Co., Akron, Ohio. Gray & Davis, Amesbury, Mass. Hall Lamp Co., C. M., Detroit, Mich. Hartford Rubber Works Co., Hartford, Conn. Hartford Suspension Co., Jersey City, N. J. Hayes Manufacturing Co., Detroit, Mich. Heinze Electric Co., Lowell, Mass. Herz & Co., 295 Lafayette street, New York. Hess-Bright Co., Philadelphia, Pa. Hoffecker Co., Motor Mart, Boston, Mass. Janney, Steinmetz & Co., Philadelphia, Pa. Kokomo Electric Co., Kokomo, Ind. Leather Tire Goods Co., Niagara Falls, N. Y. Lebanon Steel Casting Co., Lebanon, Pa. Light Manufacturing and Foundry Co., Pottstown, Pa. Lovell-McConnell Manufacturing Co., Newark, N. J. McCord Manufacturing Co., Detroit, Mich. Manhattan Screw and Stamping Works, West End avenue and Sixty-seventh street, New York. Michelin Tire Co., Milltown, N. J.

Morgan & Wright, Detroit, Mich.

New York.

Ind.

Mosler Co., A. R., 163 West Twenty-ninth street,

Motsinger Device Manufacturing Co., Pendleton,

Stewart & Clark Manufacturing Co., Chicago, Ill. Stromberg Motor Device Co., Chicago, Iil. Swinehart Clincher Tire and Rubber Co., Akroa, Ohio. Timken-Detroit Axle Co., Detroit, Mich. Timken Roller Bearing Co., Canton, Ohio. United Manufacturers, Broadway and Seventy-sixth street, New York. United States Light and Heating Co., 30 Church street, New York. Valentine & Co., 257 Broadway, New York Veeder Manufacturing Co., Hartford, Conn. Vesta Accumulator Co., Chicago, Ill. Warner Gear Co., Muncie, Ind. Warner Manufacturing Co., Toledo, Ohio. Warner Instrument Co., Beloit, Wis. Westchester Appliance Co., 15 Canal place, New York. Wheeler & Schebler, Indianapolis, Ind. Whitney Manufacturing Co., Hartford, Conn. Witherbee Igniter Co., Springfield, Mass. UNATTACHED ACCESSORY EXHIBITORS. Allen Auto Specialty Co., 1926 Broadway, New York. Alexander, H. T., 17 State street, New York. American Automobile Association, 437 Fifth avenue, New York. American Stepney Spare Wheel Co., 1773 Broadway, New York. Auburn Mica Co., Auburn, N. Y.
Automobile Club of America, Fifty-fourth street,
West of Broadway, New York. Automobile Supply, Broadway and Fifty-ninth street, New York. Automobile Topics, 103 Park avenue, New York. Bosch Magneto Co., 223 West Forty-sixth street, New York. Bretz Co., J. S., Times Building, New York. Brown Co., Syracuse, N. Y. Brownell, F. A., Rochester, N. Y. Burrough Rims, 114 Liberty street, New York. Class Journal, 239 West Thirty-ninth street, New York. Clover Manufacturing Co., 151 East 126th street, Cycle and Auto Trade Journal, Philadelphia, Pa. Compact Co., 71 Broadway, New York. Connecticut Oil Co., Waterbury, Conn. Cotta Transmission Co., Rockford, Ill. Cross, Frank H., 1773 Broadway, New York. Cryder & Co., 583 Park avenue, New York. Doolittle Rim Co., 1666 Broadway, New York. Dover Stamping and Manufacturing Co., Cambridge, Mass. Driggs, Seabury Ordnance Corporation, Sharon, Duffy Grease Co., 520 West Fortieth street, New York. Eastern Carbon Works, Jersey City, N. J. Elite Manufacturing Co., Ashland, Ohio. Flentje, Ernst, Cambridge, Mass. Fried Ostermann Co., Rockford, Ill. Frasse & Co., P. A., 130 Worth street, New York. Garage Equipment Co., Milwaukee, Wis. Gasoline Motor Efficiency Co., 1 Exchange place, Jersey City, N. J. Geiszler Storage Batteries, 514 West Fifty-seventh street, New York. Havoline Oil Co., 80 Broad street, New York.

Haws, G. A., 73 Pine street, New York. High Frequency Coil Co., Los Angeles, Cal. Hill Manufacturing Co., Buffalo, N. Y. Hilton Manufacturing Co., Boston, Mass. Horseless Age, 9 Murray street, New York. Howard Demountable Rim Co., Trenton, N. J. Hydraulic Oil Storage Co., 25 Broad street, New York. International Engineering Co., 1779 Broadway, New York. Ideal Wind Shield Co., 1845 Broadway, New York. Johns-Manville Co., 100 William street, New York. Johnson & Co., I. G., Spuyten Duyvil, N. Y. Keystone Lubricating Co., Philadelphia, Pa. Kilgore Manufacturing Co., Boston, Mass. Lazarnick, N., 346 West Forty-second street, New York. Lavalette & Co., 112 West Forty-second street, New York. Lutz Lockwood Manufacturing Co., 39 Cortlandt street. New York. Light, Oliver, Providence, R. I. Merchant & Evans, Philadelphia, Pa. Metal Stamping Co., 30 Hubert street, New York. Miller, Chas. E., 97 Reade street, New York. Morrison, Ricker Co., Grinnell, Is. Miller Sons, W. P., Long Island City, N. Y. Moller & Schumann Co., Marcy and Flushing avenues, Brooklyn, N. Y. Meyers, A. J., 9 East Twentieth street, New York. Motor Vehicle Publishing Co., 24 Murray street, New York. Motor, 2 Duane street, New York. Newark Rivet Works, Newark, N. J. National Surety Co., 115 Broadway, New York. New Jersey Car and Spring Co., Jersey City, N. J. New York Coil Co., 338 Pearl street, New York. New England Auto Journal, Times Building, Pawtucket, R. I. Newmastic Tire Co., Broadway and Sixty-eighth street, New York.

Nightingale Whistle Manufacturing Co., 1693
Broadway, New York. Nonpariel Horn Manufacturing Co., 139 Emerson place, Brooklyn, N. Y. Noonan Tool and Machine Co., Rome, N. Y. Osburn Electric Co., Detroit, Mich. Perfection Spring Co., Cleveland, Ohio. Perfection Wrench Co., Port Chester, N. Y. Polson, W. F., Buffalo, N. Y. Prosser & Son, Thos., 15 Gold street, New York. Quincy, Manchester, Sargent Co. or Motor Parts Co., Plainfield, N. J. R. I. V. Co., 1771 Broadway, New York. Raimes & Co., 50 Ferry street, New York. Rothstein Manufacturing Co., 1941 Park avenue, New York. Rushmore Dynamo Co., Plainfield, N. J Rutherford Rubber Co., Rutherford, N. J. Salman, John A., Boston, Mass. Shipman Instrument Co., Sunbury, Pa. Sireno Co., 39 Cortlandt street, New York. Siro Carburetor Co., Springfield, Mass. Smith, Fred W., Aberdeen, S. Dak. Standard Leather Washer Co., Newark, N. J. Standard Metalwork Co., Thompsonville, Conn. Stanley & Patterson, 23 Murray street, New York. Spooner & Wells, 1931 Broadway, New York. Stevens Co., 375 Broadway, New York. Stewart Auto Academy, 231 West Fifty-fourth ttreet, New York. Supplementary Spiral Spring Co., 1876 Broadway, New York. Tracy, Joseph, 116 West Thirty-ninth street, New York. Traver Manufacturing Co., P. C., Far Rockaway, L. I. Troy Carriage Sun Shade Co., Troy, Ohio. Tuttle Co., D. M., Canastota, Union Battery Co., Bellville, N. Y. Vanadium Metals Co., Pittsburg, Pa. Vehicle Apron and Hood Co., Columbus, Ohio. Victor Tire Traction Co., Boston, Mass. Wayne Oil Tank and Pump Co., Fort Wayne, Ind. Westinghouse Companies, Boonton, N. J. Wilson Trading Co., 46 Cortlandt street, New Y. M. C. A., 318 West Fifty-seventh street, New

York.

York Auto Wheel Co., York, Pa.
Zeglen Tire Co., Chicago, Ill.
Gibney & Brothers, Jas. L., 217 North Broad
street, Philadelphia, Pa.

### To Manufacture Commercial Vehicles.

The United Vehicle Company is being organized in Boston by A. L. Waugh, Frederick Wells and J. G. McDonald, to manufacture a line of commercial vehicles ranging in carrying capacity from ½ ton to 5 tons. Mr. Waugh has been a commercial vehicle dealer for a number of years and has considerable experience in the mechanical end of the business. It is planned to acquire a building site adjoining the present Waugh plant and erect a concrete factory of 80,000 feet of floor space thereon. An output of 150 cars is planned for the first year.

New Factory for the Springfield Car. The Springfield Motor Car Company, of Springfield, Ill., are erecting a saw-tooth roof building of brick and concrete, 500 by 260 feet, to be devoted to the construction of the Springfield car. Their 1910 car is a four cylinder, 5 by 434 inches, seven passenger ear, having a 128 inch wheel base, 36 by 4 inch front and 36 by 5 inch rear wheels. The car is to be marketed, fully equipped with Bosch magneto top, lamps, etc., for \$2,500. The officers of the company are: H. C. Medcraft, president; R. W. Haas, vice-president; E. E. Stoltz, secretary; A. H. Rankin, treasurer.

#### Additions to Oscar Lear Plant.

Receiver Charles Bauer of the Oscar Lear Automobile Company, Springfield, Ohio, on November 9 obtained permission from the courts to erect an addition to the plant, of the company, not to exceed \$25,000 in cost, and immediately gave a contract for the erection of two reinforced concrete buildings, of which one is to be 100x60 and two stories high, and the other 195x60 feet and one story high. Work on the new buildings has already begun.

#### Commercial Notes.

The Minneapolis (Minn.) Police Department is to be provided with an automobile at a cost not to exceed \$2,000.

The new central police station in St. Paul, Minn., will be equipped with a high power touring car and an electric patrol wagon.

The Detroit Board of Health has purchased a four passenger electric brougham for the use of Dr. Guy L. Kiefer, the health officer.

The City Council of Birmingham, Ala., has placed an order for a 45 horse power Rambler combination pumping engine and hose truck, which will be delivered in the near future.

It is reported that a company is being formed among business men of Stamford, Conn., and the outlying country districts for the purchase of a large motor truck and

a motor omnibus to be operated between Stamford and Bedford Station, Mt. Kisco, Katonah and several of the towns and villages along the Harlem Railroad.

The Twin City Taxicab Company, which was recently incorporated in Minneapolis, Minn., with \$600,000 capital stock, plans to have a taxicab service with about sixty cabs in operation by February I next.

#### **Business Opportunities.**

Albert Hiorth, an electrical engineer located at Josefinegade 19, Christiania, Norway, who has maintained relations with the American automobile industry for many years, and C. L. Segelke, a student of agriculture, have applied for a Norwegian patent on a reaper drawn by horses and having the sickle operated by means of a motor. A machine to try out the invention will be built before next summer, and the trials will be made at the Christiania Agricultural College. Mr. Hiorth would like to hear from manufacturers of suitable small motors.

A report has been received from an American consular officer in a European country forwarding a request from a local business man for quotations on automobiles and freight cars with a carrying capacity of five tons without platform. The party in question is willing to pay one-third with order and the balance upon the arrival of the cars, these terms having been quoted by European manufacturers. He has opened a school for the instruction of drivers, and, should American cars be satisfactory a most profitable field will be opened for these goods. Further detailed information in the report can be obtained by interested firms upon application to the Bureau of Manufactures.

An American consular officer in Canada reports that there are no manufacturers of automobiles or parts in his district, and for that reason there is an excellent opening for manufacturers of American automobiles. Until recently there were many restrictions as to the use of the public highways by motor cars, but these restrictions have all been removed. The consular officer states there are a number of manufacturing agents who might be interested in the acceptance of a reliable agency, but on account of the accessibility of the field it would be well for interested firms to send a representative to the city in which he is located for the purpose of establishing an agency for the coming year. The address can be obtained from the Bureau of Manufactures, Washington, D. C., by referring to No. 4,168.

#### Obituary.

Our Milwaukee correspondent telegraphs that George L. Odenbrett, junior member of the Bates-Odenbrett Automobile Company, Buick and Winton agents in Milwaukee, was killed on November 29, by an explosion which wrecked the plant of the Gas Tank Recharge Company, of which he was part owner. Mr. Odenbrett was the first automobile owner in Wisconsin.

### GARAGE AND SALESROOM.

#### The Stoddard-Dayton Garage, Los Angeles.

One of the largest of the fifteen new garages completed in Los Angeles during the last three months was occupied October I by the Stoddard-Dayton Motor Company, general selling agents for the Stoddard-Dayton and the Baker electric cars west of Colorado. The building, a two story structure in Mission style, is located on the corner of Olive and Tenth streets, within four blocks of the business centre, and in the heart of the coming automobile district of Los Angeles. Olive street is the only thoroughfare within a short distance of the Los Angeles business district that is not encumbered by car tracks, leaving the highway clear for motor traffic, and a movement is on foot to have the street declared a boulevard in order to prevent the granting of a franchise for a street car line.

The lower floor of the building, with dimensions of 100x140 feet, is occupied by the salesroom, the offices and the garage. Fireproof walls extending through the second floor and 4 feet above the roof, together with double fire doors, separate the garage from the rest of the building. The salesroom, 100x40 feet, fronts on Olive street, and is lighted by large plate glass windows from the front and side. The tiled floor, the neutral tints of the walls and the massive beams of the ceiling create an atmosphere of solidity and refinement. It offers ample space for the display of sixteen models. A fireproof driveway leads from the showroom to the garage in the rear of the building, and this driveway divides the offices running almost through the centre of the building between the showroom and the garage. The offices occupy a space 100x17 feet, less the room taken up by the driveway. Separate office rooms have been provided for the president, the treasurer and secretary, the bookkeeping department and the general office, and two rooms are set apart for the salesmen. The toilet rooms for customers are located at

can find accommodation on the floor. Two pits, with cement steps leading down into them, have been provided for the accommodation of customers desiring to make an inspection of their cars. An electric elevator 10 feet wide, with a capacity of 3 tons, transports cars to the shop on the second floor. Two gasoline tanks containing



NEW STODDARD-DAYTON GARAGE, LOS ANGELES.

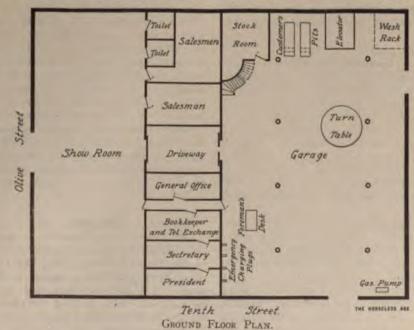
the end of the transverse row of offices, with doors leading to the showroom.

The entire rear portion of the building, 100x170 feet, is given over to the garage, which has two separate entrances, one leading into the room directly from Tenth street, while the other one extends along the rear wall of the building, and also emerges on Tenth street. The floor is of concrete on which rest two rows of steel pillars supporting the beams that carry the upper portion of the structure. Forty cars

120 gallons each are located under the Tenth street sidewalk. A Bowser long distance pump lifts the fluid into a portable tank wheeled alongside of the cars. A similar system is used for the distillate used for cleaning purposes, of which 140 gallons are stored under the rear driveway. A turntable for the turning of trucks is located in front of the elevator. A store room occupies one corner of the garage, and is filled with light sundries and the oil supply. The garage is also equipped with four emergency charging plugs for electric vehicles.

The garage takes care only of the business of the firm's customers. It is open night and day, and can be entirely closed up and isolated from the rest of the building. The same is true of the electric charging plant on the second floor, provided with seventeen rheostats for supplying current to the batteries. The elevator opens directly into the charging room where the largest amount of business is transacted during the night.

The shop on the second floor is directly above the garage, and has the same dimensions, 70x100. Its floor is of cement, with a wash rack, draining into a sink below the driveway in one corner. Both the wash racks in the garage and in the shop are equipped with reflectors raised and lowered by pulleys. The toolroom occupies the space corresponding to the stockroom in the garage. Light is admitted to the shop from two sides and through skylights. Two continuous benches, 140 feet long, ran



along the walls, and each workman has his individual drawer for his tools and a locker for his personal belongings. Four engine jacks, two drill presses, a 16 inch lathe, an emery wheel, a full set of tools and dies constitute the equipment of the shop. A gas blower is used instead of a forge. An air line with cocks all along the benches has been installed.

Special efforts have been made to provide fire protection. An 80 gallon chemical truck is stationed in the garage, besides thirty portable fire extinguishers, four dozen "kill fires" and a hose line. It was discovered that barrels of sand offered even better protection than the chemicals, and a plentiful supply of this cheap extinguisher was placed in all parts of the building.

One of the most important portions of the establishment is the stockroom, or rather series of stockrooms, on the second floor. Since the firm supplies the trade of the entire Pacific Coast, a complete line of Stoddard-Dayton parts is carried. The smaller parts are stored in cases arranged according to the different models. Cylinders. crank and transmission cases, rear and front axles, tires, rims, frames and mud guards, car springs and wheels from the earliest to the latest 1910 model are kept on hand, thus making it necessary to devote a space of 100x17 feet, corresponding to the offices on the first floor, to the storeroom. Besides these parts the firm carries in stock every fibre, rubber, felt and copper washer and gasket, every spring used in the different models. A still larger storeroom. 40x100, corresponding in size and location with the showroom on the first floor, contains the new cars of the firm, together with rear seats, tops and one body of each model. This room has not yet been finished up, as it is to be used as an additional showroom when business warrants.

The firm has an elaborate system of bookkeeping and checking, using consecutively numbered blanks in triplicate for every transaction, whether it be the issue of a spring from the storeroom or the order of a carload of new models from the factory. The blank forms of the system fill a cabinet 9 feet wide, 7 feet high and a foot deep. Special attention is paid to the accurate recording of the cost of work performed, both in labor and material. Except for cash sales every customer is required to sign his name to an order for the work to be done or the supplies to be furnished. These repair orders are in triplicate, all copies bearing the same serial number. The original is filed with the signature of the customer. The first copy, containing on its back ruled columns for the date, the description of each piece of work done on the car, for the name of the workman performing it, for his time, for the total cost and the charge, goes to the bookkeeper. The third copy, on heavy brown paper, goes to the foreman of the garage. Besides the order and the columns for its itemized cost it contains special columns for the cost and the charge for material, and for outside labor and material.

Every workman is daily furnished with a time card, each card being placed in a holder and suspended on a board in the shop. On this card the workman must account for every minute of his working time. Every separate piece of work performed by him must be entered on his card, giving the number of the repair order, the customer's name, a description of the work. and the number of hours and minutes required on the job. The card must be dated and signed by the workman at the end of every day, thus enabling the foreman to determine the labor cost of a particular job at a glance, besides preventing waste of time.

#### Kansas City Dealers Part Company.

Fifteen members of the Kansas City Motor Dealers' Association withdrew from that association on November 20, and organized the Motor Car Trade Association. They have engaged Convention Hall for the week of January 17, for the purpose of giving a show, and have issued an invitation to all of the members of the old organization to participate in it. The Kansas City Motor Dealers' Association, however, held a meeting at the Hotel Kupper. on November 20, and decided to hold its show in Convention Hall, as originally planned, during the week of February 28. They held another meeting on November 27, for the election of new officers (some of the old officers having seceded) and the appointment of a show committee. W. S. Hathaway is chairman of the show committee of the new Motor Car Trade Association.

### Brooklyn Dealers Complete Organization.

The Brooklyn Automobile Trade Association was definitely organized at a meeting held at the establishment of the Allen-Swan Company on November 24, and the following officers were elected: W. H. Kouwenhoven, of the I. M. Remsen Company, president; Lew H. Allen, of the Allen-Swan Company, first vice president; Joseph D. Rourk, of the Haynes Company, second vice president; C. M. Bishop, of the Ford Company, secretary, and F. C. Kirkham, of the Maxwell Company, treasurer. The association will hold its annual meeting on December 14.

#### Portland Auto Dealers Elect.

The Portland Automobile Dealers' Association held its annual meeting at the Commercial Club on Monday of last week. Officers for the ensuing term were elected as follows: President, C. F. Wright, of Ballou & Wright; vice president, P. A. Coombs, of the Archer-Coombs Company; secretaries, R. E. Blodfett, of the Firestone Tire Company, G. S. Brackett, of the White Motor Car Company. The membership of the organization has been materially

strengthened during the past six months because of the advent of nearly a dozen new dealers in the Portland field, and as a result a feeling of keen rivalry has prevailed between the old and new dealers. It is hoped that the organization will bring the dealers in closer touch with one another and this commercial enmity will vanish.

#### Garage Notes.

Los Angeles, Cal.—W. R. Woolwine has taken possession of the new garage on Olive street, near Eleventh. Mr. Woolwine has the agency for the Oldsmobile and Cartercar.

Los Angeles, Cal.—W. J. Burt, superintendent of the Tourist Motor Car Company, of this city, is organizing the W. J. Burt Motor Car Company, and will take up its active management on January 1 next. The company will be incorporated with a capital stock of \$50,000, and will handle the Auburn car and carry a stock of Tourist parts.

RIVERSIDE, CAL.—Charles Young is having an 85x157 foot garage erected on Main street. The front of the building is of gray stone. The offices and salesroom in the forward part of the building are to be finished in mahogany, and to have tile flooring.

SAN FRANCISCO, CAL.—The Pioneer Automobile Company, of which E. P. Brinegar is president, will shortly move from its present location in Golden Gate avenue and Octavia street, to a store on Golden Gate avenue, between Gough and Franklin streets. A stock room and repair shop will be secured in the vicinity.

DENVER, Col.—Charles E. Johnson will begin work on a garage on the same block as the Corona school, the school board having withdrawn their protest against its erection.

NIANTIC, CONN.—George B. Dickinson is building an extension to his garage on Main street.

BRIDGEPORT, CONN.—I. D. Carpenter has let the contract for the erection of a 60x74 foot brick garage on Harrison Court. The building will have concrete floors and a gravel roof.

STREATOR, ILL.—Charlie Hutchinson is erecting a 55x150 foot concrete block garage at 125 South Park street. George Benckendorf and M. Kakara, agents for the Moline car, will have charge of the new concern.

CROWN POINT, IND.—P. Williams is about to remodel part of his livery stable into a garage and repair shop. It is his intention to run an auto livery in conjunction with his horse livery.

Indianapolis, Ind.—The Buick Motor Company have established a new repair department at 459 South Alabama street.

FRANKFORT, IND.—Laird, Alford & Forsythe, who have been engaged in business under the firm name of Frankfort Auto Company and the Motor Car Sales Company, have sold their business and garage

on East Washington street to Wm. Kernodle and B. F. Jones, both of Jamestown, who will do a general auto and repair business. They will handle the E-M-F.

FORT MADISON, IA.—The Automobile Supply and Engine Company have opened for business at 213 Cedar street. E. Corsepius is manager and George Cuthbert superintendent. The company will conduct a garage business in addition to manufacturing marine engines. Several lines of autos will also be handled.

GRUNDY, IA.—The Grundy Auto Company and the Burd Auto Company have consolidated. The main place of business will be Grundy Center, and a branch will be maintained at Waterloo. The company will handle the Mitchell and Oakland.

MAQUOKETA, IA.—J. G. Roberts, of Lost Nation, has taken a five years' lease of the garage to be erected by A. A. Hurst, next to the Hurst Hotel.

MARSHALLTOWN, IA.—Mohr & Crawford, who conducted a garage and machine shop at 119-123 East State street, have dissolved partnership. Mr. Crawford has sold his interest to W. A. Norton. Hereafter the firm will be known by the firm name of Mohr & Norton.

OSAGE. IA.—W. J. Towner has bought the garage of Oscar Grow.

Pella, Ia.—Work has commenced on the Fowler Auto Company garage. The structure will be entirely of steel, and will be fireproof.

Bridgeton, Mr.—Henry J. Halkett has built an addition to his workshop on Flint street, to be used as a garage.

WINNIPEG, MAN.—T. Eaton Company are erecting a garage on Graham and Carlton streets to cost \$6,500.

BALTIMORE, MD.—The police department are to have a 22x24 foot one story brick garage erected in the rear of the Central Police Station, to house the Central District automobile patrol.

BALTIMORE, MD.—The White Automobile Company have let the contract for the erection of a 76x134x156 two story fireproof building on the southeast corner of Mt. Royal avenue and Hunter alley, to cost \$16,500.

BOSTON, MASS.—The Corlew-Coughlin Motor Company have recently remodeled a building on Hawkins street, to be used as a garage and repair shop.

Boston, Mass.—George H. Lowe, the well known automobile dealer, of this city, has organized the Henderson-Lowe Company to handle the Midland car in the New England States. Salesrooms in charge of Mr. Lowe will be opened at 117 Massachusetts avenue.

TURNERS FALLS, MASS.—A. H. Rist is building a garage in the rear of his residence on South street.

WATERTOWN, MASS.—Henry E. Fleming has obtained a permit to build a garage on his property at 24 Elliot street.

DETROIT, MICH.—The new Oldsmobile garage on Woodward avenue and Sproat

street will be formally opened this week. The salesroom is finished in Mission oak. Herbert Flint is manager.

Detroit, Mich.—The Firestone Tire and Rubber Company sustained a loss of \$20,000 by a fire which completely destroyed the historic old Biddle House, the lower part of which was occupied by several concerns dealing in automobiles and accessories. The Jackson Auto Company also sustained a loss of \$2,500; the Detroit Tire and Repair Company, \$1,000, and the Studebaker Company, \$1,000. A number of machines were rescued before the fire department arrived.

GRAND RAPIDS, MICH.—The Ford Motor Company, of Detroit, have opened offices and a garage at 161 and 163 North Owatta street, in charge of R. E. Becker.

Bemidji, Minn.—John Moberg has opened a garage.

MINNEAPOLIS, MINN.—The Motor Sales Company are erecting an addition to their garage on Sixth street, which they expect to be ready for occupancy by December 15. The new structure is being joined to the present building, and when finished the company will have 5,000 feet of floor space.

Morris, Minn.—Lawrence Zahl will establish an auto livery.

WHEATON, MINN.—L. A. Wilson, of Berlin, Wis., is to open a garage and repair shop in a week or two.

Kansas City, Mo.—The Midland Motor Car Company have moved to their new headquarters at 1523-25 Grand avenue.

KANSAS CITY, Mo.—The L. C. M. Motor Car Company, recently organized, have opened quarters at 3816 Main street. They will handle the Palmer-Singer and Simplex cars.

KANSAS CITY, Mo.—The name of the Ettwein Motor Car Company has been changed to the McGee-Huckell Motor Car Company. The agency handles the Mora, Fiat, Wilcox, Courier, Crawford, Stoddard-Dayton and Fritsche electric.

Kansas Crry, Mo.—Meils Motor Company will hereafter occupy the present quarters of the Auburn Motor Car Company at 624 East Fifteenth street. They will handle the Lambert car. The Auburn Motor Car Company removed to Grand avenue

SPRINGFIELD, Mo.—A garage is being erected for Frank Hood and James Ellis on South Jefferson street, adjoining the Queen City Laundry. The building will be of concrete blocks and will cost \$7,000. It will be ready for occupancy in about two months.

ANACONDA, MONT.—C. H. Branscombe will have charge of the garage now in course of erection on West Park street, when completed.

AINSWORTH, NEB.—Geo. Sawyer and W. E. Smith have bought the new garage building from R. S. Rising.

LEIGH, NEB.—The Leigh Motor Company are constructing a two story brick garage on Main street.

JAMESTOWN, N. DAE.—Ray Lamberton has sold his interest in the Sixth Avenue Garage to Buckley & Rand.

NEWARK, N. J.—P. Broderson is having a garage erected on Central avenue near Shepard.

NEWARK, N. J.—Joseph S. Isidor is having plans drawn for the erection of a garage at 402 Prospect avenue.

NEWARK, N. J.—H. J. Koehler has purchased the property formerly occupied by the Motor Car Company of New Jersey, at 289-293 Halsey street.

BUFFALO, N. Y.—M. J. Healy is building a cement block garage on the Root property on Main street.

NEW YORK CITY, N. Y.—The three story stable at 271-273 West Eighty-seventh street is being converted into a garage for Hugh F. Weston, as lessee.

ROCHESTER, N. Y.—A. M. Zimbrich will move to larger quarters on Plymouth avenue South, property recently purchased from the United States Automobile Company.

Toledo, Ohio.—The Norris-Toledo Motor Sales Company have opened salesrooms and offices at 623 and 625 Madison avenue. They have the agency for De Mot, Parry and Velie cars.

PHILADELPHIA, PA.—Alfred C. Gobson has let a contract for the erection of a garage at 707 Westview avenue. Estimated cost, \$4,700.

PHILADELPHIA, PA.—Edward C. Benson, formerly secretary and treasurer of the Philadelphia Automobile Company, has joined the sales staff of the Packard Automobile Company, of Philadelphia.

PHILADELPHIA, PA.—The Franklin Motor Car Company have moved into a new garage at 3430 Chestnut street, where they occupy two floors measuring 40x120 feet. A repair shop will be conducted in connection with the salesroom.

PHILADELPHIA, PA.—The Longstreth Motor Car Company, agents for the Pullman car, have opened a branch store at 912 Chestnut street. The company are occupying temporary quarters at 1407 Race street, until the completion of their new building at 257 North Broad street.

PHILADELPHIA, PA.—The Oxford Automobile Company's garage was completely destroyed by fire last week, together with thirty-three automobiles belonging to individual owners that were in the building. The fire was caused by a lighted match dropped by a man who was looking for a leak in a gasoline tank. The loss, which will fall largely upon the owners of the machines, is said to be over \$75,000.

READING, PA.—The Boyer livery stable at the corner of Cherry and Pearl streets is to be transformed into a garage.

READING, PA.—The Bertolet Motor Car Company have been organized, and secured quarters at 15 South Fifth street, to handle the Mitchell and Hupmobile in Berta, Schuylkill and Lebanon counties. Dr. J. M. Bertolet is president of the company.

### NOTES OF THE INDUSTRY AND THE SPORT.

R. A. Duff plans to manufacture carburetors in Nebraska City, Neb.

In Birmingham, Ala., there are about 550 cars, according to the registration figures.

The Seeley ignition system has been adopted by the Columbia Motor Car Company, Hartford, Conn., for 1910.

The Studebaker Automobile Company announce that they may add \$100 to the price of their Studebaker E-M-F "30" about February I.

Lectures on aerial navigation and automobile engineering are to be given at the Vienna Technical High School in the course of the present winter.

A company is being organized at Bay City, Mich., with a capital stock of \$100,000, to manufacture and place on the market a motor truck built by Toeppner Brothers of that city.

It is reported that the De Schaum-Hornell Automobile Company has secured an option on 32 acres of land near Wyandotte, Mich., with the object of erecting an automobile and parts factory

The Nebraska Puncture Proof Company has been organized in Omaha to manufacture a jelly-like compound which is claimed to render pneumatic tires puncture proof when injected into the inner tubes.

The Solax Auto Truck Company, which was organized in Kansas City about a year ago with a capital stock of \$50,000, is negotiating with the Greater Leavenworth (Kan.) Club regarding removal to Leavenworth.

Two persons were instantly killed and another seriously injured when 7 feet of a new concrete smokestack in course of erection at the factory of the Rapid Motor Vehicle Company crashed 158 feet to the ground on November 19.

The Detroit-Dearborn Company (not Dearborn-Detroit, as mentioned in a recent issue) have been organized since August 16, and inform us that they have their factory established. They will produce a four cylinder, 30 horse power car.

H. D. Wilson, the head of the Packard Motor Car Company's Paris office, says that from January 1 to September 30 he was in touch with more than 200 Packard touring parties in Europe, and expected to have a total of 250 at the end of the year.

The Federal Rubber Company, of Cudahy, Wis., have increased their capital to \$620,000 paid in, and it is contemplated to increase this amount to \$750,000 January 1. The Federal Rubber Company have completed a new tire building, which will have a capacity of 250 tires a day and 500 inner tubes. The company have just opened a branch in Atlanta, Ga., with the Dunham Rubber Company. They also have an exclusive agency in St. Louis with the Phoenix Auto Supply Company, and in Kansas City.

Mo., with the Motor Tire and Supply Company.

The Vanguard Manufacturing Company, of Joliet, Ill., have opened a selling branch at 1427 Michigan avenue, Chicago, under the management of C. H. Johnson.

At Ascot Park, Los Angeles, November 20, a Corbin car, equipped with the Seeley ignition system, won first in a 5 mile handicap and second in the "10 mile free-for-all."

In Missouri 5,500 licenses have been issued to private owners since the new law went into effect on August 16, as well as 1,800 to drivers and 300 to manufacturers and dealers.

The Elkhart Carriage and Harness Company, of Elkhart, Ind., have completed the first car of their new low wheeled, pneumatic tire type, and sent it on a test run to Milwaukee.

The Continental Caoutchouc Company, of 1788-90 Broadway, New York city, have placed an agency in Los Angeles, Cal., with the E. A. Featherstone Company, 1018 South Main street.

The Rainier Motor Car Company have on exhibition at their salesroom at Sixtyfourth street and Broadway, New York, the beautiful Atlanta trophy won by L. A. Disbrow at Atlanta, Ga.

The Beyster-Detroit Motor Company has been organized at Detroit with a capital stock of \$50,000 to manufacture light livery cars and runabouts in the plant of Beyster, Thorpe & Co., 1329 Woodward avenue.

The Royal Tourist Car Company, of Cleveland, announce that they will turn out 400 cars during the present season, in series of fifty. Their line includes a runabout, two touring cars, a limousine and a touring car with special dustless body.

The Maxwell-Briscoe Motor Company have issued a photograph showing their various plants, which represent 119 acres. By the first of the year, when the additional 175,000 feet of factory space now in the course of erection is completed, the company will have on its payroll nearly 6,700 employees.

The Times Square Automobile Company, of New York, have established a distributing depot in Philadelphia at 238-240 North Broad street. The showrooms and repair shop will cover about 9,000 square feet of floor space. This is the fifth branch store of the firm, which also has stores in New York, Chicago, St. Louis and Kansas City.

Machinists employed by the Empire Motor Car Company at Indianapolis are on strike, and it is understood the company is not negotiating for them to return to work. Recently the company posted a notice that after December I the men would be expected to work ten hours each day, except Saturday, when they would work five hours, with time and one-half for overtime. The

men are demanding nine hours daily except Saturday, when they want to work five hours, with overtime at one and one-half times the regular scale.

The Raber-Lang Company, of South Bend, Ind., have completed their first two automobiles, both two cylinder machines, one rated 16-18 horse power and the other at 18-20 horse power. They will probably be marketed at \$500 and \$650 each. Charles McLaughlin is superintendent of the firm.

The Ford Motor Company have established a branch in London, England, at 55-59 Shaftesbury avenue, in charge of P. L. D. Perry. Mr. Perry was for some years the senior member of the automobile firm of Perry, Thornton & Schrieber, who handle the Ford throughout the United Kingdom.

The Edgewater-Fort Lee hill climb scheduled for Thanksgiving Day had to be postponed on account of a sleet storm until December 4 at I P. M. The course was coated with ice and snow, and, in addition to the fact that no spectators would have been attracted under these conditions, there would have been great danger to the contestants.

S. M. Comley and E. D. Davidson, president and secretary, respectively, of the National Fuel Company, of Columbus, Ohio, have assembled a two cylinder runabout, which will probably be manufactured in quantities next season. It is proposed to incorporate as the Buckeye National Motor Car Company and to locate the factory in Columbus.

The Simplex Automobile Company, of New York city, have bought the plant of the Empire Foundry Company in New Brunswick, N. J., where they will make castings for their cylinders, etc., and later also do other work. The company will move out to New Brunswick by degrees, but their headquarters will remain in New York for the present.

Eight dealers of Fort Worth, Tex., held a meeting at the Board of Trade rooms on November 23 for the purpose of organizing an association and arrange for a show in connection with the fat stock show to be held in Fort Worth in March. M. A. Sacksteder, of the Dallas Automobile Association, made an address, dwelling upon the advantages of organization.

At the annual meeting of the stockholders of the Barndt-Johnston Auto Supply Company, of Columbus, Ohio, the present officers were re-elected for the coming year as follows: C. Christian Born, president; Walter R. Johnston, vice president, and Charles F. Barndt, secretary-treasurer. The announcement was made that because of largely increasing orders more than \$100,000 would be expended in making extensions to the plant on Donaldson street. The concern

was started several years ago to make buggy and auto bodies, but recently the product has been broadened considerably.

The first "Badger" to be produced by the Badger Motor Car Company, of Columbus, Wis., was shipped to the general distributors, Webb Jay & Co., Michigan avenue, Chicago, on November 24.

The Empire Tire Company, of Trenton, N. J., have opened a Philadelphia branch at 322 North Broad street, in charge of E. B. Richardson, who has been connected with the company for years.

#### Club Notes.

The Sternberg Manufacturing Company, Milwaukee, Wis.—Capital stock, \$50,000. Incorporators, William Sternberg, Ernst M. Sternberg and Robert M. Hayssen.

A motorcycle club was formed at Macon, Ga., on November 19, with W. E. Pendleton as president. The organizing meeting was held in the office of the Macon Chamber of Commerce.

The board of trustees of the New Jersey Automobile and Motor Club have expelled G. W. Edmondson from the club as the result of a conviction of reckless driving. The charge was admitted by Edmondson.

The A. C. of America will hold its annual banquet in the ball room of the Waldorf-Astoria Hotel, New York, on January 31. Frederick D. Underwood has been appointed chairman of the banquet committee.

The Ohio Valley Automobile Club directors held a meeting at the Board of Trade Assembly Hall, Wheeling, W. Va., on November 23, to discuss the new ordinance that was introduced in the City Council on the same night.

Secretary Bert Van Tuyle, of the New York State A. A., and of the Rochester A. C., is at present making a trip around the State, visiting all of the automobile clubs, both those affiliated with the State Association and those not.

The Upper Westchester Automobile Club held a meeting at the office of Clinton S. Arnold, in Ossining, N. Y., on Nevember 18 and considered the question of joining the A. A. A. It was decided to lay the matter over until the next meeting.

The annual great winter competition of the Royal A. C. of Sweden will be held this winter, February 20-23, between Stockholm and Gothenburg, a distance of about 300 miles. Two prizes will be offered, known respectively as the "Winter Cup" and the "Gothenburg Cup."

A Buffalo motorcycle club has just been formed at Buffalo, N. Y., with a membership of 105. It is proposed to hold a triunion meet between the motorcycle clubs of Buffalo, Rochester and Syracuse, one meet to be held May 30, one on July 4 and one on Labor Day. The Buffalo Club proposes to rent a house on Main street, with facilities for storing a large number of machines. Runs will be held every Sunday. The acting officers at present are: E. C. Cramp, president, 912 Main street; Thomas

French, Jr., secretary-treasurer, 895 Main street.

The Texas Automobile Association was organized at San Antonio on November 16 and will affiliate with the American Automobile Association. The following board of directors was elected: R. W. Carr and C. C. Cresson for San Antonio, E. H. R. Green and E. Corey for Dallas, Percy Williams for Waco, and Dr. A. H. Evans and Joe Debona for Eagle Pass.

The Tampa (Fla.) Automobile Club, at a meeting held at the Board of Trade on November 18, discussed a project for the construction of an automobile track in that vicinity. Options have been secured on two tracts of land, but one of them will expire shortly. About \$23,000 would be required for the purchase of the land, and of this \$9,000 has been subscribed.

The Royal A. C. of Great Britain will publish a work entitled "A Record of Motor Racing," of which Gerald Rose is the author, and which contains a preface by Prince Francis of Teck. In addition to the history of automobile races it contains a number of special chapters on such subjects as "The Timing of Motor Races," "The Mechanical Details of the More Important Cars," etc.

The Cleveland (Ohio) A. C. at a meeting last week elected the following officers: W. F. Bonnell, president; Harry L. Vail, vice president; C. J. Forbes, Jr., secretary; F. T. Sholes, treasurer. Resolutions of sorrow were adopted on account of the death of E. Shriver Reese, a former president of the club. Negotiations were practically completed whereby the Aero Club of Cleveland will make use of the clubrooms of the automobile club.

The trustees of the New Jersey Automobile and Motor Club have decided upon the property of Dr. Leslie D. Ward, in South Broad street, as the most desirable site for their proposed new clubhouse. It is planned to issue \$100,000 5 per cent. bonds, to be secured by a first mortgage on the property, to raise the necessary money for the purchase of the site and the erection of the building. The property has a frontage of 50 feet on Broad street, and a depth of 200 feet

The Jacksonville (Fla.) A. C. held its annual meeting on November 19. A committee was appointed to call upon the mayor to urge the enforcement of the ordinance prohibiting the throwing of glass on the streets. Charles A. Clark was re-elected president, W. M. Stinson was elected first vice president, J. E. Johnson second vice president, and Frank C. Boylston re-elected secretary and treasurer. The subject of constructing a speedway came up for discussion. A three mile track, leading partly over already built roads, was generally favored, and a committee was appointed to report on the proposition at a special meeting. Complaints were made about the restrictions enforced in South Jacksonville, where the speed is limited to 6 miles per hour, and a committee was appointed to call on the mayor of that city and to urge a modification of the ordinance. Steps were taken to take out a charter for the club.

#### Racing Notes.

The statement in our last issue that Barney Oldfield broke the mile record for one mile tracks at San Antonio, Tex., on November 15, was incorrect. This record is held by Ralph De Palma, in a Fiat Cyclone, and was made at Minneapolis.

A concrete wall three feet high and one foot thick has been built around the course at the Indianapolis Motor Speedway and it is believed this will be sufficient to keep racing cars from leaving the track. The paving on the course is about completed and the grand stands are also about finished. When the speedway is reopened next month the seating capacity will be double what it was at the August meet.

#### Trade Personals.

W. T. Powell has been appointed Western sales manager of the Hartford Rubber Works Company, to succeed William H. Bell.

Fred E. Castle, of the Atwood-Castle Company, of Amesbury, Mass., is stopping at the Hotel Astor, New York city, showing the company's 1910 product.

Edward Fritton, who has been superintendent at the factory of the Covert Motor Vehicle Company, in Lockport, N. Y., has been elected secretary of the company.

William H. Bell has resigned from the position of Western sales manager of the Hartford Rubber Works Company, to become manager of the Chicago branch of T. B. Jeffery & Co.

Edward C. Huhn has been appointed manager of the Keystone Lubricating Company automobile oil branch at 1327 Race street, Philadelphia. Mr. Huhn was formerly connected with the Puritan Soap Company's branch in Philadelphia

F. E. Weir, who has been connected with the sales forces of several of the leading manufacturers during the past ten years, has been appointed manager of the new Ford Pittsburg branch, temporarily located at 130 North Highland avenue.

W. Hildreth has resigned from the position of vice president and manager of the Holsman Automobile Company, of Chicago, with whom he has been for the past seven years. Mr. Hildreth informs us that his resignation is entirely voluntary, and that the company has his best wishes. He expects to spend some months in travel and recreation before taking up active business again, but his home will remain in Chicago.

The Cincinnati Hospital has recently been equipped with a motor ambulance which carries cots for four patients. The cots are in use ordinarily, one swinging over the other, but if necessary a bank can be drawn down on the other side as an upper berth in a sleeping car, and seats that fit together can be used.

# The Horseless Age

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### Building a Car from Standard Parts.

By E. J. Bartlett

Not so very long ago the fact that a car was made up even in part of standard units purchased complete from a parts manufacturer doubtless had a certain cheapening effect, and to say the least did not in itself add prestige to the product. There was reason for this feeling. Parts manufacturers in general were not abreast of the times, and the "made in our own factory car" had distinct practical as well as selling advantages.

There has been a change in the situation in the past few years, as the parts business has gained a firmer footing, and as the manufacturers have developed and perfected their products. As the market has developed a better grade of parts has been demanded, and perhaps naturally they now conform closely in quality to the cars in which they are used. It may fairly be said that at the present time the parts in general on the market as standard are not as highly developed as a few of the leading high grade cars; they are on a par with the average high grade and medium cars, and in advance of many of the cheaper cars which are trying to gain a foothold.

USED BY ESTABLISHED FIRMS.

During the past year or two the bulk of the parts sold has been used on cars with established reputations, and which have been produced by competent organizations. The only reason for using standard parts was the fact that a larger output of finished cars was possible, as the factory at hand could be devoted entirely to the manufacture of some of the most important or distinctive units. There was a factory, however, and an organization having both business and technical men familiar with automobile construction. Under such conditions the use of more or less standard units was successful.

As the market for finished cars has broadened and increased, more and more standard parts have been used by the established automobile builders, and doubtless many engaged in other lines of business, not realizing that any special business or technical training was necessary, have argued that if the use of some finished units in a car was successful, a car built entirely of finished units would be equally as good. At any rate, a multitude of "assembled car" companies are springing up all over the country, depending entirely on the parts manufacturers for their being. Coincident

with this sudden increase in the demand for parts from this source, hundreds of carriage builders are entering or preparing to enter the automobile field. In most cases they are better equipped financially than the newer companies; they have factories for the necessary body work, sales organizations, and a factory organization, none of which have, in general, any special training in the automobile business. These two important additions to the industry made an enormous prospective demand on the parts makers and many new parts companies are being formed, some of which are doubtless as poorly equipped as the buyers to enter the business.

#### ALLUREMENTS AND PITFALS.

On the surface the building of cars from finished parts or units appears attractive. The parts makers guarantee and presumably are responsible for their products and extend credit. Agents are found who will pay advance deposits on cars. A factory for assembling with a very small machine tool outlay, a little capital for running expenses and the business is

Whether the new company is formed by men who are conducting other lines of business or is a side venture of an established company in some other business, the men responsible for it almost invariably have had no previous experience in automobile manufacture. If a new company, a more or less practical man knowing something of the rudiments of automobile engineering and construction is engaged to select the parts and oversee the construction of the car. If it is an old company branching out into the automobile field these duties are usually assigned to the superintendent of the old company who is doubtless a practical man, but who knows little or nothing of automobile engineering. Right at the start many of the newer companies are thus making a vital mistake. They underrate the difficulties of building a commercial car from standard parts. They do not realize that fully as good and experienced an automobile engineer is required as though an entirely new car was to be designed from the ground up. They depend too much on the different parts, each, perhaps, correctly designed for different conditions, working together satisfactorily as a combination. Only the best automobile engineer procurable can make a distinct success of such a venture, and even then he needs the support of a sound business and factory organization.

LINE OF PROCEDURE

While the details incident to forming the company are being completed the engineer solicits bids from the parts makers for parts suitable for the class of car it is decided to build. After a deal of correspondence and talking with the salesmen of the various parts companies a preliminary line-up of the parts procurable is possible. This line-up shows that it will be impossible to obtain exactly the parts for the car as first planned, as some parts cost more than the amount allotted to them, while other parts desired cannot be obtained in time, as the makers have too much earlier business on hand. To get certain parts in time and at the price allowed, it may be necessary to throw the whole design out of balance, some parts being heavier and more expensive than necessary, while others are too light for the car. Parts makers refuse to make their products specially to suit the conditions at hand, and the engineer is obliged to use constructions he would prefer changed. Eventually out of the chaos a fairly satisfactory line is selected by the engineer and the business organization prepares to close the contracts.

#### MUST HAVE GOOD RATING.

Not infrequently a bump of trouble is here encountered. Parts makers have been too often caught in the past with a lot of parts made up specially, to some extent, for new companies who have failed. Business is better, so they are not obliged to accept long chances, and unless a satisfactory rating can be shown insist on a deposit or guarantee of the financially sound parent company, or of some of the individuals of the company who are personally worth the amount of the contract. In vain the business manager points out the rosy future, the wealth of the men "back of the company," the large business which will be placed next year, and so on. The parts manufacturer is unmoved, as he has heard it all before. Some of the contracts are finally closed on various compromises of terms, while others are refused, and the engineer is told to look further for certain parts. In the meantime his options have expired, the parts companies have taken on more business, and what he finally is able to select that his company can buy again throws his design out of balance.

#### MISFITS.

The principal parts once secured, the engineer can turn his attention to details of their construction which previously he has been, to some extent, obliged to neglect. He finds, for example, the hub caps on the front and rear axles do not match, that his front hubs come drilled for twelve snokes and his wheels with ten spokes; that the steering arm on the front axle has a one inch ball, and on the steering column lever a 11/4 inch ball; water piping on the engine doesn't match the radiator, the universal joint doesn't fit the pinion shaft on the axle, and the rear bearing of the transmission is not large enough to take the torque of the braking and driving strains. It seems that nothing is properly designed, and he blames the parts makers for their seeming inconsistency, and yet they are naturally furnishing what their experience shows is most generally required. The inherent trouble lies in the fact that the various parts were not designed to be used together. Many troubles could have been avoided by proper engineering specifications when contracts were closed, and would have been by the experienced engineer. Nor are all the difficulties discovered when the first cars are assembled. With use more serious troubles develop. The brakes will not hold and the axle is blamed, yet it is probable that the arrangement of levers is wrong, and is entirely beyond the control of the axle manufacturer. Some of the lighter parts begin to fail, the clutch is too "fierce" for the transmission gears, the car is too heavy for the

springs perhaps, and other troubles which only develop with use of the car.

#### GRADUAL DEVELOPMENT NECESSARY.

During the first season much can be done to remedy and soften the most glaring inconsistencies and effects by an experienced organization, and here again the experienced engineer is of value. Secondary only to the first design of an assembled car is its development. None of the high grade cars of the present time were developed in a single season. They are the result of much thought and experiment extending over several seasons, not only of the engineer but of the whole organization. It is essential then that the business organization have a commercial knowledge of the industry if they are to assist in the development of their car. It is likewise essential that the factory and the factory organization assist in the development.

#### THE PROBLEM OF DELIVERY.

Then there is the problem of delivery to be considered—of vital importance at the present time. Unavoidably, perhaps, a single unit is delayed, and as effectually holds up the delivery of cars as though all the parts were lacking. In the meantime other parts are coming in according to contract, and must be paid for, and considerably more money is found necessary than was at first contemplated. Indeed, the assembled car manufacturer is completely in the parts manufacturers' hands, and non-delivery, poor design or poor material in any one of a dozen units may go far toward wrecking the business for an entire season.

In briefly mentioning a few of the difficulties  $\epsilon$ f the assembled car business no mention has been made of the factory and small equipment necessary for assembling. To have this work intelligently and economically done, considerable study, expense and time must be devoted to the organization as a whole, to the assembling fixtures and methods, and to the manufacture of the many miscellaneous small parts which are difficult to buy outside.

#### OBJECT NOT TO DISCOURAGE.

It is not the object of this article to try and discourage new companies from entering the automobile field through the open door of the assembled car or the branching out of companies in other lines of business into the automobile industry, but rather to point out briefly that real difficulties are to be expected, and must be overcome if anything like satisfactory results are to be obtained.

To attempt to treat fully the problem of building a car from standard parts from the business, engineering and manufacturing standpoints, from the building of the model car to the furnishing of repairs for the stock cars, would make too long a story. Possibly enough has been said to convey the fact that the problem is not as easy as at first appears; that business, engineering and manufacturing experience, as well as factory equipment, in this line of business is essential to success, and above all that intangible asset called organization, or team work, which is seldom appreciated until missed, must be developed.

It takes brains, time and money to get this equipment even for the building of assembled cars, and therein lies a real difficulty which is often ignored by the newly formed company. With such an equipment, and with sound financial backing, there is no doubt that the assembled car can be made a success.

# Extra Losses in Transmission on Rough Roads and Curves.

#### By Albert L. Clough.

In the discussion of the manner in which the power developed by a vehicle motor is expended much has been written in regard to the absorption of energy by normal tractive resistance, air resistance and hill climbing. Efficiency tests of transmission elements have, moreover, thrown light upon the magnitude of the energy wastes due to these parts. There are, however, a few energy consuming factors of minor importance, to which very little consideration is usually paid, but which are not entirely to be ignored.

So long as a car is moving at a constant speed the energy which was absorbed in bringing it up to that speed—the energy of acceleration, or the kinetic energy of the car—is stored in the moving vehicle, and there is no further call for energy for this purpose so long as the condition of uniform speed persists.

LOSS IN ACCELERATIONS AND RETARDATIONS.

The energy represented by the motion of a 3,000 pound car moving at the rate of 10 miles per hour, or its  $\frac{W v^2}{2R}$ , amounts to

about 10,000 foot-pounds, and this amount of energy represents the expenditure of about 18 horse power for a period of one second. That is, in order to accelerate such a car from rest to a 10 mile per hour speed, in one second of time, the motor will be required to deliver energy for this purpose at the average rate of 18 horse power.

In order to accelerate the same car from rest to a speed of 40 miles per hour, on the level, the expenditure of about 29.0 horse power for 10.0 seconds is demanded—the power required to overcome all resistances being ignored in this discussion.

If it were practicable to drive for long distances at a uniform speed the energy of acceleration would be hardly worth talking about, but this is not usually the case. In driving through crowded traffic, with any regard to "making time." the progress of a car consists of a succession of reductions of speed by means of the brakes and of accelerations. The same is true of a car traversing roads on which are frequent hummocks and pitch holes, which must be negotiated at slow speed.

If the car must be slowed down to 5 miles per hour for each of these and speeded up to 15 miles per hour over the smooth spaces between them, at each repetition of this manœuvre an expenditure of about 7 horse power for five seconds is required. If the slowdowns are sufficiently numerous the aggregate of the energy thus called for amounts to something not at all negligible.

Another case in which the energy of acceleration becomes of substantial moment is in delivery service with very frequent stops. With electric vehicles the call for energy to effect acceleration is a rather serious matter, and an excessive number of stops and starts vitally reduces the mileage obtainable from a charge. Of course, if a car is allowed to "drift" up to the stopping point by withdrawing the clutch, and the brakes are not applied, the energy of ac celeration is not wasted but is usefully returned in keeping the car in motion for some time after power has been cut off. Slowing down a gasoline car by closing the throttle or retarding the spark, or both. is, in effect, the same as applying the mechanical brakes.

#### TURNING CURVES.

When a car turns from one street into another intersecting it at right angles, it usually traverses approximately a circular quadrant which is tangential to its initial and final straight paths. Under these circumstances there is no direct drain upon the store of dynamic energy in the car. That is, if the wheels do not slip and if there be no increase of frictional resistances there will be no diminution of the kinetic energy of the moving mass. In practice, however, these conditions are not realized. The centrifugal force acting normally to the circular path at the centre of gravity of the car acts to cramp the front wheels on their bearings and to bring added pressure upon the thrust bearings in the rear axle, thus causing unusual frictional losses at these points. In the case of a car with its weight equally distributed upon its four wheels, drifting around a corner so that its centre of gravity makes a circular arc of 50 feet radius and at a speed of 9.83 feet per second, or 6.7 miles per hour, the centrifugal force acting amounts to 1,800 pounds, and each front wheel is subjected to a side pressure of 450 pounds, tending to cause abnormal friction at its bearings, while the rear axle thrust bearings have to carry an abnormal stress of 900 pounds.

The above speed is taken as an example, because it is the highest speed at which such a car can turn upon a flat macadam road under the imposed conditions without slippage of the wheels taking place, under the assumption that the coefficient of adhesion is 0.6, as will be seen from the following considerations: The adhesion of the car is 0.6 W, where W is the car weight, in pounds, and the centrifugal force acting, in pounds, is  $\frac{W v^2}{g r}$ , where v is the speed

of the car in feet per second, r is the radius of the path in feet and g has its customary significance. When car adhesion and centrifugal force are equal the vehicle is upon the point of slipping sidewise.

0.6 W = 
$$\frac{W}{gr}$$
 · · · 0.6 =  $\frac{v^3}{gr}$  · · ·  $v^3$  = 0.6  $gr$   
· · ·  $v^2$  = 0.6 × 32.16 × 50 = 965. · · ·  $v$   
= 9.83 f. p. s. = 6.7 m. p. h.

Beyond this speed there will be a loss of energy due to slippage. Suppose a car to be "drifting" at such a speed that it slips bodily sidewise 2 feet out of its natural path in making such a turn, and assume that the coefficient of friction of its tires on the road remains the same as the coefficient of adhesion. The work done in such a slippage in the case of a 3,000 pound car will be

 $0.6 \times 3000 \times 2 = 3600$  foot-pounds, and about 6.5 horse power will have to be applied to the wheels for one second to replace the energy which has been withdrawn from that stored in the form of vehicle motion.

It is hardly practicable to evaluate the

energy loss due to increased friction in rounding curves, but it is considerable even with the best anti-friction bearings.

#### DIFFERENTIAL GEAR LOSSES.

So long as a car is drifting in a curved path the differential gear is in action regulating the angular velocities of the rear wheels to fit their respective paths, but the only load which it is transmitting is that occasioned by the friction of its own parts, of the driving gear, the propeller shaft, universal joints, the gears of the transmission and the clutch bearings. If the car is being driven around a curve, under power, the differential gear is actually transmitting energy to the wheels, and is thus operating under load. So far as can be recollected no tests of differential gear efficiencies have been published for various loads and various speed ratios of the two rear axle shafts. It is safe to say that the losses in the differential are quite heavy, especially when transmitting considerable energy to the wheels of a car moying in curves of small radius. At any rate it is rather general practice to declutch just before turning a sharp corner, and to "pick up" the lost speed when the straightaway is again reached, in order to avoid working the differential under load.

The fact that in making a turn abnormal bearing stresses and the tendency to slip are inversely as the radius of the curve and directly as the square of the speed is the obvious explanation of the almost instinctive action of every driver in making as broad a turn as possible and slowing down. Modern traffic regulations allow the left hand turn to be made on a much larger radius than the right hand turn. Following excessively winding rutted roads calls for quite an expenditure of power. There is a considerable increase of bearing friction due to side stresses upon the wheels, and a considerable loss from the friction of the sides of the tires upon the walls of the ruts. The differential, too, is rather busy under these conditions.

#### SLIPPING OF WHEELS.

If the drive wheels of a car slip upon the roadway in their own plane by a certain percentage, just that percentage of the energy transmitted to them from the motor is lost as heat in the tires. Experiments have shown that at ordinary driving speeds over good roads in normal condition the percentage of slip is very small. At racing speeds, however, it is rather a large matter. In deep sand and in mud the percentage of slip may be large at ordinary speeds, and may even be total. Where it is total, the tractive resistance of the car is greater than the force of adhesion of the driving wheels. It would be interesting to obtain some idea of the rate of slip in excessively heavy sand by applying an odometer to the rear as well as the front wheels, and noting the difference in their readings. Some researches upon driving wheel ship have been made in connection with taxicab service, and taximeters are now generally driven by the front wheels, so that no injustice may be done patrons by charging them for the useless slip of the rear wheels on slippery roads.

#### SPRING LOSSES.

When a vehicle is driven over a generally level but smoothly undulating road surface, the draft of energy required to carry the car up the rises is replaced by the coasting tendency due to the corresponding declines, frictional losses being excepted. This is true, however, only when the spring supported parts of the car do not move relatively to the running gear. If spring movements occur there is a loss of energy, for all motion of the spring supported parts is finally damped by the friction of the springs themselves, or by the shock absorbing devices used in connection with them. The absorption of power by spring movements is not readily evaluated, but constitutes a considerable loss of energy on rough roads. If the spring supported parts of a car weigh 2,500 pounds, and a road irregularity gives rise to a total change of position of 4 inches between the centre of gravity of the car and the running gear, it is plain that more than 825 foot-pounds are absorbed by this action, this figure representing the energy required to lift the spring supported parts from their lowest to their highest position against gravity. Nearly two horse power must be applied for a second in order to replace the energy thus lost in heating the springs and shock absorbers, and in reality rather more than this. Side sways of the body also absorb energy, and in fact none of the work transmitted to the springs is ever recovered.

#### MISALIGNMENT OF BEARINGS.

Efficiency tests of transmission parts as performed in the laboratory are almost always made with the elements rigidly held in perfect alignment. In practice, despite the use of universal joints, some misalignment is likely to occur when a car is driven over rough roads. Such misalignments account for losses much in excess of those indicated by laboratory experiments, especially in the universal joints.

Movements of the rear axle relatively to the rest of the car result in changes in the angular speed of the rear wheels, whether chain or shaft drive is employed, and these actions are a source of wheel slip, and of abnormal stresses in the transmission element which become of importance when a car traverses rough highways.

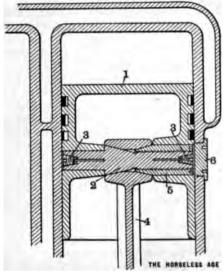
This subject was ably treated in three articles by S. Gerster, published in Volume XIX of this journal, on pages 391, 432 and 463, which will be found worthy of a rereading in this connection.

One generalization which may obviously be made in connection with the preceding subject matter is that, in the main, all these causes of energy loss are present on crooked and rough roads, and absent on smooth, straight roads. No one can tell how much the rough road is costing those who drive automobiles, but it is certain that it constitutes a source of enormous economic waste.

### Adjustable Piston Pin and Valve Plunger Designs.

By W. F. Cooper.

The following described constructions are the result of some experiments of the writer in endeavoring to provide means for taking up the wear which occurs in the bearings and some of the other parts of motor cars. I have been considerably interested in observing the apparent tendency of some of the more prominent manufacturers to abandon non-adjustable features. This is a point which I believe has been greatly neglected,



' Fig. 1.

and it would certainly appear that if a motor car is going to be anything other than an expensive luxury means should be provided for taking up this wear, so that it will not be necessary for the owner to invest in a new car every second or third year at the most.

Two of the parts which are probably subject to the most wear, and wear that is least easily taken up, are the piston pin and the push rod, sometimes termed the valve plunger, as used in the four cycle engine. This valve rod is that part which operates upon the bottom of the valve to lift the same, and is generally provided with a roller or disc portion on the bottom upon which the cams act when raising the valves. To overcome this objection to these parts I have designed adjustable bearings for the same. Both of these constructions have been made and used by the writer, and have proved to be practical and easy to adjust.

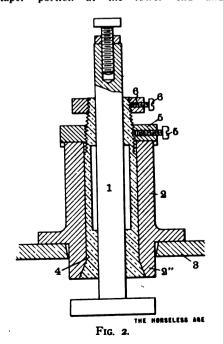
In Fig. 1 is shown the upper portion of the cylinder and piston. The piston 1 is provided with slightly larger bosses or bearings for the piston pin 2 than usual. This piston pin is split at each end and provided with taper socket set screws 3, for expanding the ends of the pin and fastening it firmly in place. When properly fitted I have found this construction to hold the pin so there is no possibility of movement.

This piston pin is provided with a taper shoulder portion which forms one-half the bearing of the connecting rod 4, the other half of the connecting rod bearing upon the oppositely tapered portion of the sleeve 5, this sleeve being threaded upon and forming a part of the piston pin. This sleeve is split lengthwise about up to its bearing portion to permit of a slight expansive movement by the set screw 3. This sleeve is provided with sockets, enabling adjustment of same when the piston is lowered to its lowest position, when the removable plug 6 is taken out. I find that with a properly shaped spanner wrench this adjustment is very readily accomplished in a few moments. I find that the slight side movement of the connecting rod, which may occur in adjusting, is very readily taken up by the slight side play which it is necessary to provide in the crank bearing.

It has been my experience that the piston pin bearing is more liable to wear than any other portion of the motor, and I believe there is no part so difficult to adjust in the average constructed motor.

The sliding motion of the cam rod makes it a particularly difficult bearing to adjust, and I believe there are no cars on the market which provide means for adjusting this part.

In the writer's construction, Fig. 2, the cam rod I is provided with the usual bearing portion for the same, 2. This bearing is attached to the crank case 3 and is centred therein by a shoulder portion 2", this shoulder portion being made large enough to permit of a ready removal up through the crank case, of the push rod and bearing, including its lower disc or roller portion, when necessary. The cam rod bushing is split its entire length and has a taper portion at the lower end and



a nut 5 having a square thread for drawing this sleeve upward and adjusting the lower portion of the bearing. The upper portion of the bearing is similarly adjusted by a taper threaded nut 6. These nuts are fastened by set screws 5' and 6' This construction was made by the writer and found to be extremely practical.

Fig. 3 shows a modification of this structure in which the bushing is screwed with

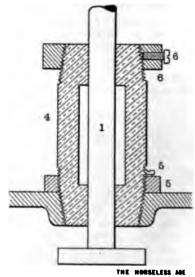


FIG. 3.

a tapered thread into the crank case, and dispenses entirely with the outer portion of the cam rod bearing, the bushing itself being made heavy enough to constitute the complete bearing. Though not constructed by the writer, I believe this would be easily effective. Would add that the adjustable construction for the piston pin shown would obviously not be applicable to four cylinders cast en bloc on account of limited space when they were previously designed for this construction.

#### Automobiles in Denmark.

According to the registration records. there were 699 automobiles and 3.418 motorcycles in service in Denmark on September 1, 1909. Of the automobiles 375 were owned in Copenhagen (138 of these heing motor cabs) and 42 in Frederikshorg. Disregarding the cars owned in Copenhagen, 151 are owned in Jutland and 131 on the islands of the kingdom. Of the latter 81 are owned in cities and 50 in the country. For Jutland the corresponding figures are III and 40. Of the 3,418 motorcycles, 516 are owned in Copenhagen, 157 in Frederiksborg, 1,415 on the islands (exclusive of Copenhagen) and 1,313 in Jutland. Of the 1,415 motorcycles in the islands, 672 are owned in the cities and 743 in the country, the corresponding figures for Jutland being 603 in the cities and 727 in the country.

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#### Mathematical Articles.

Now and then we publish in THE HORSE-LESS Age an article on some technical subject in which mathematics is used to a considerable extent. We do not believe that on the average there is as much as two pages out of the thirty which we generally run that can in any sense be called mathematical, yet this small amount seems to loom very large to some readers who eschew mathematics-to judge by their protests. We have in mind particularly two recent letters. One of the writers, in renewing his subscription, says that "the average automobile man has not the education, or if he has the qualification he has not the time, to follow out the calculations we see so much in your journal. He wants to get at the conclusion, and often when reading the calculations is left in doubt as to the conclusion."

Another, writing in a jocular vein to one of the proprietors, thinks that the high browed professors among the readers are given too much consideration, and the low browed element is neglected. He also refers particularly to mathematical articles, and voices the opinion that there must be a way of expressing the same thing in ordinary language, without recourse to mathematics, so as to make it intelligible to the average non-mathematical reader.

That this bias against mathematics, as we might call it, is not peculiar to readers of this publication was brought home to us very strongly a few weeks ago when the American Machinist printed an editorial in which the view was expressed that mathematical articles had on non-mathematical readers something of the same effect as the proverbial red rag on a bull.

Our own view of the matter has been that mathematical articles interest only a small class of our readers, but that these are the men who most strongly influence the progress of design, and therefore deserve recognition. There is no such person as an average reader. Our readers range all the way from the novice, who does not yet know a differential gear from a universal joint, to the most expert technical men. It would be impracticable to try to print only matter of interest to one particular class, because to do so would mean neglect of all other classes. What we do attempt to accomplish is to offer something of interest to every class of men concerned with automobiles. This field is certainly none too broad. There is such a thing as specialization overdone. The modern metropolitan newspaper has its various departments, its sporting, theatrical, real estate, financial and other sections, and nobody nowadays buys a newspaper with the expectation that all of its contents shall be of interest to him. Why should anybody expect this of a trade or class paper? Human interests and inclinations are too much diversified to permit of this.

In answer to the observation that everything expressed by mathematical formula ought to be capable of expression in ordinary non-mathematical terms, we would say that it is, but non-mathematical treatment of involved technical subjects is generally extremely awkward and wasteful of space. It would be like drawing up a bill for goods without the use of numerals. This can also be done, but such a bill could not be recommended for clearness and handiness. The root of the trouble, however, is not that the treatment of the subjects is unintelligible to a good many readers, but that the subjects themselves are of no di-

rect interest to them. Take, for instance, the series on the "Calculation of Chassis Springs" which has just been concluded. It contained only elementary mathematics, but a good many formulæ and a good deal of tabular matter, neither of which classes of reading matter is exactly adapted for self entertainment. To strain a point, this subject could also be treated largely or entirely without the use of mathematical symbols, but not to any advantage, so far as we can see. The great body of automobile owners, numbers of whom read THE HORSELESS AGE on account of its serious tone and brevity of expression ("more automobile facts to the square inch than in any other publication," as a recently received letter aptly expressed it), do not want to learn to calculate spring sizes, nor do the many garage men, salesmen, repair men, etc. Such involved problems as spring calculations, for instance, will always be referred for solution to relatively small classes of experts.

It is therefore our view that while only a limited amount of space can be given to such matters, they should not be entirely neglected, as not only the experts but the whole automobile community profit from the technical advancement resulting from the discussion of these problems of construction in the trade press. This view, we must confess, is based more or less upon our own personal inclinations, and not upon any very comprehensive inquiry into the tastes, preferences and requirements of our readers. And here we might state that our aim is to make a paper of "the greatest good to the greatest number" of our readers. That there are some among our subscribers who read mathematical articles we know from the fact that almost every more important article of this class is followed by a discussion in our Comments and Queries from Readers. That many, on the contrary, consider these articles useless and superfluous we know from letters of friendly criticism and casual remarks dropped by our correspondents. So far as direct commendatory remarks on mathematical articles are concerned we must confess that practically none have ever come to our ears, though we presume that this is due to the fact that the technically trained engineer regards it as a matter of course that such articles should appear in a technical paper. Counting, therefore, only direct pro and contra evidence as to the popularity of mathematical articles, the weight of evidence is largely contra, and this naturally tends to incline us to discontinue publishing such articles. If, then, there are those among our subscribers who read and appreciate these articles, and consequently wish to see them continued, let them send us a brief statement bearing on the value of these articles to them and to the industry in general. If we receive such letters in any number we shall know for sure that the space given to mathematical discussions is not wasted.

#### Providing Against Forgetfulness.

Human fallibility in the matter of properly maintaining the supplies carried by a car is a quality always to be reckoned with, and considerable ingenuity has been devoted to expedients by which the annoyance and delay resulting from forgetfulness or slackness upon the part of the operator in this regard may be avoided.

The installation upon a car of more than one source of electrical energy for ignition purposes, one or more of which sources it is intended shall be used mainly at least as reserve supplies, is a case in point.

Another common instance is the reserve fuel supply, contained in a separate compartment of the main tank, communicating with the carburetor through a separate valve normally kept closed. Even though no reserve tank is provided upon a car, the market affords strong, compact hermetically sealed, portable tanks holding about I gallon each, one of which may be kept filled in the carrying space of the car for emergency use.

The "reserve" idea has also been applied to the lubricating oil supply. Realizing the annoyance and possible damage which may arise from the exhaustion of the regular supply of oil normally contained in the lubricating system, a supplementary or emergency supply is provided upon certain makes of cars. This secondary supply may be contained in a tank located under the hood, fastened to one of the frame members, upon the running board or elsewhere, which is usually piped to the engine lubricating system. Gravity may be depended upon to draw the oil from the tank, but more often a hand pump is provided. Moreover, certain oil makers are furnishing their product in packages of convenient and attractive form, fitted with straps for attachment to the running board, thus permitting of the ready carrying of an emergency supply.

One manufacturer of gas tanks for vehicle lighting has applied the "reserve"

principle to this branch of automobile service by bringing out a cylinder of acetylene gas under pressure of such small size and convenient shape that one may readily be carried at all times in the tool box or luggage space. In event of the exhaustion of the regular gas supply, this small emergency tank is readily attached to the lamp piping by means of rubber tubing, and quite a number of hours of illumination are thus provided, sufficient to permit the car to reach a point where the discharged gas tank may be exchanged for a fresh one.

In the practical application of the "reserve" principle, it is essential that the reserve supply shall be properly maintained at all times, that it shall never be drawn upon unless actually required, and that if drawn upon it shall be at once replenished. If these rules are disregarded the good offices of the system cannot be realized with any degree of certainty.

#### Easily Operated Clutches.

In reading the published descriptions of the new models it will be observed that increased attention has been paid to reducing the muscular exertion required in releasing the clutch.

Improvement along this line will be welcome, especially considering the fact that certain cars, even of rather late design, have been equipped with clutches of notoriously hard operation.

The driving of an automobile should be almost entirely a matter of intelligence rather than brawn, and there is little excuse for the use of control devices the operation of which is unduly fatiguing when continued for considerable periods.

Now that women are generally beginning to drive gasoline cars it is more than ever before desirable that control devices should operate with only moderate effort, one of the main arguments for the safety of the automobile in the hands of women drivers being that, unlike the "hard bitted" horse, its control is within the muscular ability of the sex.

Easy clutch disengagement may be brought about by so designing the clutch that the engaging spring pressure may be reduced by increasing the leverage between the pedal and the movable clutch member and by reducing the friction of the operating linkage.

Manufacturers using multiple disc clutches are able to reduce the spring pressure required, by increasing the number of discs used, or by the use of discs of materials possessing higher frictional coefficients. Those employing other forms of clutches most naturally turn to an increase of pedal leverage as the readiest solution of the problem.

However obtained, an easily disengaged clutch adds greatly to the pleasure of driving a car, especially when long trips or service in congested traffic are undertaken.

# Changing Popularity of Body Styles.

There are signs which indicate that the roadster type of body is at present considerably less popular than it was a year or two ago. At present the average manufacturer probably lists a greater number of different body styles than ever before in the history of the industry, and individual taste should be more readily satisfied than ever before. Among these styles of body is, of course, the roadster, with its various arrangements of rear seats, but this style appears not to retain its former relative importance. Apparently its place is being taken, to quite an extent, by the small tonneau, either detachable or fixed, which is known by the names "toy tonneau," "demitonneau," and so forth.

It may be that the erstwhile popularity of the roadster type was founded more largely upon mere fashion than upon any inherent merit.

Undoubtedly the roadster, with rumble seats, is fairly satisfactory when the use of the rear seat is of an entirely incidental character and for very short distances, but for long rides it is ill adapted in every way. The small tonneau seats the same number of passengers as the double rumble seat, but carries them comfortably and securely. As the automobile becomes more and more a humdrum vehicle of everyday utility, comfort and utility may be expected to become the main factors in the choice of body styles, and the desire after the sporty and unusual will exert less influence. Perhaps the surrey type, which furnishes rear seating accommodations of a character intermediate between the double rumble and the toy tonneau, may be found to meet the requirements of those who desire a light and handy rear body design which still affords the necessary degree of comfort and security.

The German Imperial Automobile Club will celebrate the tenth anniversary of its foundation by a banquet in the banquet hall of the Restaurant Rheingold, in Berlin, on January 15 next.

### MAINTENANCE AND REPAIRS.

# How Covers and Tubes Are Vulcanized.

By JAY TEEL

Having been asked by a friend for some instructions for operating small vulcanizers, I thought that our tire experiences of the last five years might be interesting to others also. In August, 1904, there came into our possession a slightly used heavy runabout. It weighed about 1,400 pounds, and was equipped with 30x3 inch clincher tires of a well known American make. Our first tire trouble occurred the first day after we received the car, a tire being found flat. It was only a tiny puncture, however, and was soon patched. We then had no tire trouble for some time, which rather surprised us, as our friends had been telling us what enormous tire bills all automobilists had. Our next trouble was from a small hole clear through one of the rear casings. We noticed it for some time, but as it was on the side well up toward the rim, where it never could touch the ground. and the superintendent of an automobile concern who had been visiting us had said that they "never thought anything of such little things," we paid no attention to it.

One day we put on the surrey seat and started for quite a spin with four persons on board." We drove about 6 or 8 miles, and then stopped at an attractive spot to enjoy the scenery. One of the party happened to glance at the tire, and noticed that the hole had become much larger, and the inner tube was bulging through it. Apparently it was only a matter of a short time when we would have a blow out on our hands.

We backed the car up to the side of the road, jacked up the wheel, deflated the tire, and were wondering what to do next when an old horse doctor in a steam runabout happened along. He examined the tire, expressed his regret at being unable to help us, and advised us to go home on the rim. As we had nothing in the shape of a tire kit but two small irons, cement and inner tube patches, we thought for a while that this was the only thing to do. Finally, however, we ripped a piece of rubber off the floor and beveled the edges with a jack knife. This was inserted in the casing to cover the hole. The tire was then pumped up, and by dint of careful driving we reached home without any trouble from it.

#### OBTAINED A VULCANIZER.

Our next job was to repair the casing. We had heard a good deal of the small vulcanizers which work with the tire on the rim and determined to get one. We obtained one of these but without the accessories which usually come with such vulcanizers.

We had a "binding rod" made to hold the vulcanizer onto the wheel, but found that it would only fit when holding the vulcanizer at the very middle of the tread. It was discarded for a small chain. By means of small pieces of wire one end was fastened to the hole on one side of the vulcanizer, and the other end to a small bolt passing through the other. A centigrade thermometer, similar to a clinical thermometer, but larger in diameter and about 51/2 inches long, was procured from a firm in Rochester, N. Y. For a source of heat we have used various things. A Bunsen gas burner, supplied by 50 feet or more of rubber tubing, running to the garage from a gas jet in the house, probably gives the most all around satisfaction.

Place the burner on a box under the vulcanizer. Regulate the temperature by varying the amount of air admitted to the burner by regulating the amount of gas admitted by means of a cock placed in the line near the burner, and by placing a small piece of metal on top of the vulcanizer as a draft check. Gasoline and alcohol torches have also been used. Next to gas they probably give the best satisfaction. If anyone should while on tour be away from civilization so long as to make it seem advisable to carry a vulcanizing kit, a Bunsen burner could probably be supplied with gas from the gas tank or generator. This need only be used until the required temperature is reached when it may be replaced by the burner of a kerosene lamp.

#### MATERIALS REQUIRED.

For material we sent to a bicycle dealer for a pound of crude rubber and a pint of Goodrich vulcanizing cement. The dealer very kindly sent instructions for their use. The method of procedure in this particular instance was about as follows:

The canvas and rubber in the vicinity of the hole were first thoroughly cleaned by means of a new file, and then a brush wet with gasoline. With the aid of a shoemaker's awl a piece of canvas was then sewn over the hole from the inside. This was done with linen carpet thread and an upholstery needle. Cement was then spread liberally over this and the adjoining surfaces from the outside. The hole was then filled with alternate layers of rubber and thin pongee silk. The top and bottom layers were considerably larger than the hole. The patch was covered with talc powder; a postcard with a hole cut just large enough to fit the patch was put on, and the vulcanizer was applied. Owing to the thickness of the patch a temperature of about 160° C. was kept up for an hour and a half.

#### CEMENT.

We soon found out that the gum rubber we were using was not the proper material. It appeared to be similar to what elastic bands are made of. Pongee silk, also, is not so suited to such work as cotton duck. We sent to the makers of our tires and bought some of their vulcanizing stock and cement. It might be mentioned that we were charged for this about one-third of what we paid for the first lot. This rubber was their own secret compound, discovered, as they said, when they were preparing tires for the Vanderbilt Cup race. The service it gives seems to be very good. The cement, they said, was merely pure gum rubber dissolved in gasoline. We found these materials very satisfactory, except that we prefer the vulcanizing stock, dissolved in gasoline, to the regular cement. It might be mentioned here that the Goodrich cement seemed to be about the same as the other except



TREAD PULLED LOOSE.



CEMENTED DOWN.



PATCH APPLIED, READY FOR VULCANIZING.

that it contained a little sulphur or some compound of sulphur.

#### VULCANIZING PATCHES.

When vulcanizing patches on inner tubes, either raw rubber patches may be used or the regular patches may be cemented on with vulcanizing cement and then vulcanized. For inner tubes and patches having but one thickness to be vulcanized 125° C. for twenty-five minutes should be sufficient for properly curing. Thicker patches require a longer time and sometimes a higher temperature in order to cure the cement sufficiently to make a perfect union of the old and new rubber. In some cases it may even be necessary to actually burn the outside of the patch in order to cook the inside properly. If the point of a sharp pencil be forced into a piece of rubber not sufficiently cured, the indentation will remain for some time. If the piece is properly cured the rubber will at once resume its former shape when the pressure is removed. Properly vulcanized rubber has a soft, velvety feeling, while the feeling of over-vulcanized rubber is hard and harsh.

Before applying the vulcanizer to a patch on an outer casing, dust the raw rubber with talc powder and wind tightly with a long strip of canvas three of four inches wide. During this time the tube should be inflated just enough for the tire to be filled out full. Mark out the patch on the canvas with a blue pencil and then apply the vulcanizer. Pump the tire up to full pressure before heating. After vulcanizing do not loosen the vulcanizer for about fifteen minutes, or until it is cool enough to be handled with the bare hands.

#### TOOLS NEEDED.

Aside from the articles already mentioned, few tools are needed for vulcanizing. There should be a suitable knife for beveling the edges of patches which stick up beyond the surface of the tire. This it will do best when heated. A roller should also be provided for smoothing and stretching patches when first applied to a tire. Those who have seen tires made in the exhibits of the Ajax-Grieb Rubber Company at the New York auto shows will readily understand its use. The instrument used by the writer is merely a porcelain insulator (a cylinder with a hole through the middle). Through this is a piece of iron rod, and a wooden file handle is struck on either end. A cobbler's awl is also useful for "calking" cracks with raw rubber.

#### REPAIRING A SAND BLISTER.

Once on coming in from a drive a sand blister was discovered on one of the front tires. It was opened and found to extend around the whole circumference of the tire. The tread was cut open and the canvas and rubber were thoroughly cleaned with a file and gasoline. It was then cemented down and the tire "half soled," i. e., that part of the casing which touches the ground was covered with a continuous strip of new rubber. This was vulcanized

down and the tire was made better than it was before the blister occurred. Now when the rubber of a casing becomes worn down to the canvas it is made almost as good as new by "half soling." By closing all holes and cuts promptly so that the canvas cannot be attacked by water, tires should be made to last indefinitely.

As mentioned before, patches are vulcanized on inner tubes. We adopted this method of repairing punctures after having several patches come off by being pinched by lugs and from being melted by friction or hot weather, and having trouble from finding patching cement all dried up. To vulcanize, clean a section of an outer casing (inflated and on the car) and strap the tube to this. Proceed as with an outer casing. Patches vulcanized properly to inner tubes will not leak and will always stick. As a certain driver for whom we once patched a tube once remarked, "The tire may come off from the patch, but never the patch from the tire." When a hole in a tube is large a patch may be put on the inside with good results.

#### LONG TIRE LIFE.

When we first purchased our machine, we were assured by our friends with all seriousness that "automobiles fairly eat rubber tires." Now, after about five years of careful use the car still stands on its four original casings. Of course, the tires are far from new, but careful driving and frequent attention has left them still able to do their work. Probably the fact that the car has been run only about four hundred miles largely accounts for this.

The following are our tire expenses, as nearly as is known:

September 27, 1904, patches and cement	\$0.15
October 6, 1904, patches and cement	. 58
October 6, 1904, inner tube (for reserve).	5.48
June 6, 1905, one pound crude rubber	2.25
June 6, 1905, one pint Goodrich cement	. 64
June 6, 1905, linen thread	.10
July 20, 1906, valve plungers	. 30
September 1, 1906, one pint Goodrich ce-	
ment	. 64
September 1, 1906, valve plungers	.30
November 1, 1906, one pound vulcanizing	
stock	-75
November 1, 1906, one-half pint cement	. 20
August 10, 1908, 2 pounds vulcanizing	
stock	1.50
Total	\$11.79

#### A Clutch Collar Repair.

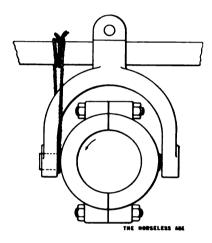
It is always a good plan to frequently oil or grease the clutch shipper collar ring, especially if one habitually keeps his foot on the clutch pedal.

The clutch collar ring having become ladly worn, one of the studs which fit into the clutch yoke broke off close to the ring, allowing the ring to rotate (by the action of the shaft), thus freeing itself from the yoke and rendering it impossible to disengage the clutch. No garage being near, a road repair became necessary.

Some double stranded fence wire being at hand, a piece about 2½ feet long was used, and after the ring had been put in its original position the wire was passed under

the stud, over the end of the fork, and the ends brought up, wrapped in opposite directions around the clutch yoke bar and twisted together. Owing to the wire being very hard to bend, the first attempt was a failure, for there was enough slack to allow the stud to slip out of the fork in the yoke. After the second winding, and with the ring well greased to reduce friction against the shaft collar, the repair served successfully to bring the car safely home, a distance of 10 miles or more. Care was of course, used not to press on the clutch pedal unless the clutch was to be disengaged, and not to disengage the clutch except when absolutely necessary.

In some cars it might have been possible, by throwing the yoke to the rear as far as possible, to rotate the ring (after having removed the grease cup) so that the remaining stud would come into the opposite fork. The shaft would then have



pushed the stud into the fork instead of tending to pull it out, thus relieving the strain on the wire. In this particular case, however, the bolts and shoulders which hold the two valves of the ring together would not permit of it.—Cornelius von E. Mitchell.

#### Refilling Prest-O-Lite Tanks.

The Prest-O-Lite Company, of Indianapolis. Ind., inform us that they have been granted injunctions against three companies, restraining them from further selling Prest-O-Lite tanks filled improperly by themselves or by others as genuine Prest-O-Lite tanks. They state that a number of companies are now being formed throughout the country, and local capital is being interested in attempts at properly refilling Prest-O-Lite cylinders. In the majority of cases the so called high pressure generator is employed, which is claimed to be extremely hazardous and liable to explode at any time. As a matter of fact, reports of explosions at refilling stations have recently been quite numerous in the press. The company are confident that the several suits started by them in Cleveland, Milwankee, St. Louis, Los Angeles and Chicago will be decided in their favor. The outcome is of considerable interest to dealers.

### COMMENTS AND QUERIES OF READERS.

# Calculation of Chassis Springs. Editor Horseless Age:

I think Messrs. Landau and Golden still fail to see the fundamental importance of inclined links, but without doubt will "tumble to it" eventually, even if it is "entirely foreign" to the subject. They say it does not cut much figure if they make the spring flexible enough in the first place, but is a good way to correct a bad spring. Isn't it a much better way to get out one with the correction already made? Messrs. Landau and Golden misinterpreted or fail to understand the meaning of a low stress, and a stiffer or stronger spring for the same flexibility. The writer has no desire to make springs of inferior material and heavier than necessary. This defeats the very object of enclosed links, and I want to be as clear as possible here; in other words, for the same dimension of spring we have 30 per cent. more flexibility with a 60 degree angle than with straight links.

Take a rear spring for a touring car, linked at both ends; first with straight links, then with links at 60 degrees to the vertical.

Springs 50 inches centre to centre (spring clips 4 inches centre to centre, l=23 inches).

Width of springs, 21/4 inches; thickness, one-quarter of an inch.

Free camber, 9 inches (from spring seat to spring eye).

Load, 1,000 pounds. Sixty degree angle of links from vertical.

Calculated 
$$f = \frac{6 P l^3}{n b h^3 E}$$
  
or  $\frac{6 \times 500 \times 23^3}{14 \times 2.25 \times .25^3 \times 30,000,000} = 2.48$   
inches defi.

Calculated 
$$f = \frac{6 \times l^2 \times P(l + p \tan \alpha)}{n b h^3 E}$$

for inclined links,

or 
$$f = \frac{6 \times 23^3 \times 500(23 + 5.5 \times 1.73)}{14 \times 2\frac{1}{4} \times .25^3 \times 30,000,000} = 3.5$$
  
defl.

In looking at the above figures, they must admit that, after all, it is not as foreign to the subject as they would have the writer believe, and the two examples are so startling that the conditions might have been mentioned if not discussed in your articles. These examples are backed by actual tests in the laboratory, on the test machine, with different angles, proper friction allowances, etc., and extended observations from actual severe road tests.

The reference to spring hangers, brackets, etc., is superfluous and quite out of place; but I might point out that the authors omitted to mention the spring clips or the anchor bolts for fastening the spring to the axle. These in some cases shorten the effective length of the spring from 4 to 6 inches. This omission only varies the results as the cube. The spirit of the three articles and of the reply forcibly suggests to

me that it is better to perceive the beam in our own eye before removing the mote in our brother's. It would be rather interesting to hear from other readers, as Messrs. Landau and Golden, with myself, have much yet to learn on calculations of chassis springs.

ARTHUR M. LAYCOCK.

#### Relative Difficulty of Air Cooling in Two Cycle and Four Cycle Motors.

Editor Horseless Age:

Your request for expressions from users of air cooled two cycle engines regarding cooling noted. I have used air cooled engines off and on for years, both types, and of much the same size. My conclusion is that there is very little difference in the amount of cooling needed. I have been showing the air cooled two cycles for the last two summers, and have driven them in our hottest spells and over the hardest kinds of Pennsylvania roads during those hot spells when the dust of the road was unpleasantly hot, and where the hills were miles long. I began with some doubt and hesitation; however, the service given has removed the distrust and substituted a feeling of certainty and satisfaction never equaled by the four cycles, air or water cooled, which I have driven in the past with what seemed to be the utmost confidence. For auto work or up to 6 or 7 horse power per cylinder I find myself preferring the air cooled two cycle engine. I have even gone further than this and designed an air cooler of the two cycle type for aeronautic purposes. The reason why a two cycle cools as well as a four is because it holds the hot gases but 120°. (The exhaust ports, according to Roberts, open about 59 degrees ahead of dead centre. I think this rather early.) The four cycle engine holds more or less of the hot gases for a complete revolution. This is three times as long, but the gases are not so hot as in the two cycle. They are too hot, however, to absorb heat from the cylinder walls, so it is likely that the hot inner skin of the cylinder sends its heat outward during this long time instead of parting with it to the cool new charge as does the two cycle. I think this fact permits one type of engine to cool as readily as the other. I find the hottest part to be in the heads. Have never had any trouble at the exhaust ports, except that sometimes a piston ring will burn fast at the exhaust side, but this experience is not uncommon with water cooled four cycle engines. The warping mentioned I have not found. The greatest pressure occurs when the piston is in the cylinder head, and up there the cylinder is machined inside and out and is more perfectly cylindrical than a four cycle. Further, I place the engine in a slightly inclined position with the inlet side on top. This lets the cool air strike the hot head and under side, but not the cool upper side. It does much to maintain the walls at a like temperature.

CHARLES E. DURYEA.

### Increased Cylinder Wall Thickness and Fuel Economy.

Editor Horseless Age:

In order to obviate the rapid evaporation and the necessity of frequently replenishing the water supply in the cooling system of an automobile there must be a sufficiently rapid circulation, and a liberally proportioned radiator to prevent the temperature of the water from rising too high. The question which arises in my mind is whether this does not in some cases result in cooling the cylinder too much to produce the best results in fuel consumption. The manufacturers of air cooled engines make a special claim to keeping the cylinder of their engines at a temperature better adapted to secure economy in fuel consumption than can be attained with the ordinary water cooled engine, and from the tests that the air cooled machines show there would seem to be some evidence to support such statements. In the case of a stationary engine, where the flow of water through the jackets can be readily controlled, there should not be so much difficulty in securing a suitable working temperature in the jacket, but the operation even of stationary engines, it seems to me, might in some cases be much improved by attention to a detail concerning which I am unable to find much, if any, information.

The function of the water jacket—or of any other device for cooling the cylinder—is to prevent the heat of the metal from rising to such a degree as to impair the lubrication, and also to prevent preignition of the charge; if the metal is cooled too much a portion of the heat of combustion is wasted by being uselessly conducted away. In a water cooled cylinder the temperature of the water cannot well be allowed to rise above 212° Fahr., but this temperature of the jacket water might conceivably result in cooling the metal too much, particularly if the cylinder bore is small and the walls thin.

In Kent's "Mechanical Engineer's Pocket Book," sixth edition, page 468, is a section on "Conduction and Convection of Heat," in which he gives the quantity of heat in thermal units transmitted per square foot per hour by conduction through a layer of

material as  $q = \frac{T^1 - T}{rx}$ , where  $T^1$  is the

higher temperature, on one side of the layer; T the lower temperature, on the other side; r the "internal thermal resistance" of the substance and x the thickness

of the substance. From this formula it will be seen that the quantity of thermal units conducted away varies inversely as the thickness of the layer of material.

Without going into a numerical example here it would seem that by merely making the cylinder walls of automobile engines strong enough to withstand the ordinary working pressures, the fact that they might be made somewhat thicker, and thus considerable loss of heat by conduction to the jacket water prevented, has been lost sight of. If there is anything to support the contention of the air cooled engine advocates that most water cooled engines are too cool to secure the best results in fuel economy, it would seem desirable to increase the thickness of the cylinder walls, and thus to prevent the too rapid conduction of the heat of combustion to the jacket water. If made too thick the temperature of the inside of the cylinders would be too high; but it would seem that by following the methods of determining the thickness necessary to withstand ordinary working pressures, as disclosed in works on machine design, there would hardly be thickness enough to prevent quite an amount of unecessary loss by conduction of the internal heat. With very large stationary engine cylinders this difficulty would be less manifest. In fact, the difficulty in extremely large cylinders would doubtless be of exactly the opposite nature.

Perhaps you or some of your readers can enlighten me as to the method employed for determining the proper thickness of the cylinder walls best adapted to prevent unnecessary loss of heat by conduction to the jacket water.

ABRAHAM B. Cox.

[Your theory is probably not without foundation, but we doubt whether it will ever be practically applied in automobile construction, for the reason that too much cooling effect is not nearly so troublesome as too little. We believe that the majority of owners would prefer the assurance of dependable cooling under all circumstances to the saving in fuel that might be effected by the changes in design referred to. Besides there is the additional weight to be considered. The only possible method of determining the proper thickness of the cylinder walls to secure maximum fuel economy would seem to be the experimental one.—ED.]

### Wire Screens in Inlet Pipe. Editor Horseless Age:

"A. L. M." asks about screens. They are advantageous in a two cycle motor. It is quite possible to run without them, but dangerous to do so. Crank case ignitions Burn up the oil, and if continued will let the bearings cut out, and the cylinder walls get so dry that the engine stops because of lack of power to overcome the wall friction. Generally a richer mixture will stop them. But this is not economic nor best. One hundred mesh screen is too fine, as it clogs quickly with road dust. It is true that dust should not get into the carburetor, but it

gets into one's watch, so it is pretty hard to keep it all out. I use 30 mesh and about 30 gauge steel wire, but think that larger mesh and heavier gauge would do just as well. There is no trouble with the present size. It will gum up in time, but is easily burned off over a gas jet and any dirt remaining can be knocked off, leaving the screen clean as when new. One screen is enough ordinarily. I use perforated sheet metal over the gauze so as to prevent its vibration. If the inlet port opens too early the flame will rush back through the gauze and heat it so hot that ignition will take place on the other side of it. In such a case the use of two gauzes is advised. These should be separated so one does not stop the meshes of the other. Later inlet or earlier exhaust opening will lessen backfiring by letting the flame extinguish before the inlet port opens, but one limits the engine speed and the other reduces the power and economy. The screen is therefore the better way. In a four cycle it betters the mixture and helps the economy.

CHAS. E. DURYEA.

### Data on Crank Case and Side Frame Design.

Editor Horseless Age:

I am very much interested in the design and construction of automobiles, particularly in the technical points. I have several works on the subject, but must say that same are very incomplete, and am looking for a complete and concise work of this nature. I want a work that will give the formulæ for figuring out the dimensions of the different parts, and all the parts. The books that I have go about so far and are practically the same. They do, for instance, give the formulæ for figuring out the crank shaft, connecting rod, piston, cylinder walls, cylinders, etc.. but not one of them gives a formula for figuring how thick to make a crank case or the webs in same. Nor does one of them give a formula for figuring out how deep and how thick to make the side bars of the frame.

Can you furnish or give me the name of a book or books that treat the points in question, or have these subjects run in your paper? I have two of your Engineering Numbers (October 2, 1907; December 2, 1909), and must say that the articles are excellent. Have you any other engineering numbers, and if so please give me the dates, so that I can order them? Also please advise me where I can get the information that I want.

C. B.

[We know of no work that treats of the subject of automobile design in a comprehensive and up to date manner, giving formulæ for the calculation of all the different parts. So far as we are aware no formulæ have yet been derived for the calculation of crank case walls and webs, and the dimensions of these parts are generally determined empirically; in other words, more or less by guesswork. An article on crank case design appeared in our issue of November 20, 1907, but contains no formulæ

for the thickness of the walls and webs. An article on the calculation of side frames appeared in our issue of August 26, 1908. While we have published one other engineering number besides the two which you mention, it is now out of print, and we are unable to supply copies of same. We can, however, furnish complete volumes bound.—ED.]

#### Reckless Employers.

Editor Horseless Age:

One reason for reckless driving has not had the attention it deserves; that is, the reckless employer of chauffeurs. He it is that keeps always at the wheel chauffeurs that have been discharged for incompetency or worse, many of them several times.

The writer was the attorney for a large garage in this city, and he came to know of many instances where chauffeurs discharged for drunkenness, theft or reckless driving were hired over and over again, each time by a different employer. In every case of hiring a little inquiry by the employer would have disclosed just what kind of a chauffeur it was. It has frequently happened in many garages that, when the garage informed the employer that his chauffeur had taken his car out on a joy ride the night before, the employer would not believe the garage, but even sometimes took his car away from the garage, at the instance, no doubt, of the joy riding chauffeur. Instances of the foregoing kind could be given by the dozen.

If dry goods men hired clerks who had been discharged by other dry goods men for theft there would be parallel conditions in the dry goods trade. When a private coachman is hired the employer takes great care in looking up his antecedents; but the same care is not shown in hiring a chauffeur.

The consequence is that the tone among chauffeurs is lowered; the efficient chauffeur, though in the majority, cannot make himself felt, as he would were he sure employers would stand by him if he himself stood for efficiency and honestry among chauffeurs

Let the reckless employer of the reckless chauffeur be called to acount.

DE WITT C. MORRELL

#### Quieting Noisy Gears.

Editor Horseless Age:

We note Mr. S. H. Johnson's inquiry in the November 24, 1909, issue of your publication in regard to the above, and would call attention to the Dixon graphite wood fibre grease, for enclosed gears, which is known to the trade as Dixon's No. 688

The Dixon No. 688 is composed of a high grade flake graphite grease with which is incorporated a given amount of finely ground cedar fibre. A resilient, spongy lubricant results that never cakes, and instead of a metallic contact the gear teeth are separated by a thin elastic cushion which makes very quiet running. The wood fibre grease also cushions the gears in

shifting, and the danger of chipping is reduced; it also acts similarly to a sponge and prevents the oils from working out of the case.

The Joseph Dixon Crucible Company, Jersey City, N. J., market this grease in a heavy consistency (so as to meet all conditions), and it is to be thinned to the consistency of the grease which has been found to give best results. Preferably this should be done with one of their lighter non-fibred graphite greases.

JOSEPH DIXON CRUCIBLE COMPANY,

L. H. Snyder.

#### Rebushing or Replacing Worn Valve Guides.

Editor Horseless Age:

As soon as possible will you kindly state through your columns various methods by which worn valve guides may be bushed or otherwise repaired, the guides in this case being cast integral with the cylinder head?

A. C.

[The best plan is probably to cut away the old valve guide entirely, tap a hole in the valve pocket wall and insert a new guide made from bronze bar stock. If the bottom of the valve chamber is flat the guide, after being screwed through the wall, can be secured with a small nut on the inside. This method of making a repair was fully described and illustrated in our issue of August 11, 1909.—Ed.]

#### Size of Tire Valves.

Editor Horseless Age:

Why won't the valve people give us a larger valve with the big tires used nowadays? The bicycle valve seems absurd. Can anyone give one good reason for its use on auto tires? H. H. Woop.

#### Annual Election of A. A. A. Officers.

President Lewis R. Speare, of Boston, Mass., was unanimously re-elected president of the A. A. A. at the first meeting of the new board of directors for 1910, held on December 1 at the Hotel Belmont, in this city. Mr. Speare has been well known in automobile circles throughout New England for many years. His determined efforts in the interest of sane driving and the observation of the rules of the road have resulted in more harmonious relations between automobilists and those who were inclined to be hostile to motor vehicles. Frederick H. Elliott was re-elected secretary for the fourth year.

Following out a suggestion of the directors on the previous day, a new office was created in the board, that of the chairmanship of the executive committee, and to this position A. G. Batchelder was elected. Mr. Batchelder will also be the editor-inchief of the official organ of the association, the American Motorist. A new man will head the contest board for the coming year, Samuel M. Butler, of New York, who, while new to this position in A. A. A.

ranks, is known to all motorists throughout the country for his executive ability and his success in promoting events at various times, as well as successfully conducting several of the largest automobile shows.

John P. Coghlin, of Worcester, Mass., as chairman of the nominating committee, presented the following report as representing the choice of the committee, and all of the officers were unanimously elected. They are:

President, Lewis R. Speare, Boston, Mass.

First vice president, Robert P. Hooper, Philadelphia, Pa.

Second vice president, Frank M. Joyce, Minneapolis, Minn.

Third vice president, F. C. Donald, Chicago, Ill.

Treasurer, H. A. Bonnell, East Orange, N. L.

Secretary, Frederick H. Elliott, New York.

Chairman of the executive committee, A. G. Batchelder, New York.

Chairman of the legislative board, Charles Thaddeus Terry, New York.

Chairman of touring information board, Powell Evans, Philadelphia, Pa.

Chairman of contest board, S. M. Butler, New York.

Chairman of good roads board, George C. Diehl, Buffalo, N. Y.

#### Big Increase in Automobile Exports.

The imports of automobiles into the United States during the month of October last show a slight decline to 144 cars valued at \$290,857, and parts valued at \$84,084, from 179 cars valued at \$327,511 and parts valued at \$54,349 in October, 1908. Of the cars imported last October, 57 were from France, 49 from Italy, 22 from the United Kingdom, 9 from Germany and 7 from other countries. During the ten months ending with October, 1909, there were imported 1,352 cars, valued at \$2,509,271, and parts valued at \$740,455, as compared with 1,135 cars valued at \$2,131,400, and parts valued at \$505,818, during the same period the previous year. Of the 1,352 cars imported during the first ten months of the current year, 781 were from France, 345 from Italy, 86 from the United Kingdom, 84 from Germany and 56 from other coun-

The export returns for October show a heavy increase in the exports of our cars, there having been exported during that month 338 cars, valued at \$439,326, and parts valued at \$83,443, a total of \$522,769, as compared with 106 cars valued at \$165,-837, and parts valued at \$47,938, a total of \$213,775, during the same month last year. During the ten months ending with October there were exported 2,764 cars valued at \$5,921,033, and parts valued at \$701,593, a total of \$6,622,626, as compared with 1,918 cars valued at \$3,971,406, and parts valued at \$525,097, a total of \$4,496,503, during the same period in 1908.

#### Russian Auto Imports and Exports.

The imports of vehicles of all kinds into Russia are increasing from year to year, according to a recent German consular report. The value represented amounted to only 1,800,000 roubles in 1906, but in 1907 it had risen to 3,500,000 roubles, and in 1008 to 5,100,000 roubles. This development is thought to be mainly due to the increasing sale of automobiles. In 1904 and 1905 only about 100,000 roubles' worth of cars were imported each year, but in 1907 the auto imports had already increased to 1,600,000 roubles, and in 1908 they increased further to 3,100,000. Large cars for four or more passengers are most in favor, and of these 2,800,000 roubles' worth were imported in 1908, as against only 300,000 roubles' worth of runabouts. Only slight progress was made by the Russian automobile industry during 1908, and native manufacturers still confine themselves almost entirely to the assembling of parts built in other countries and to the manufacture of bodies. These home products, however, are not in great demand. In the line of pleasure vehicles French products enjoy the preference, while in the field of motor trucks and omnibuses German products are in the lead. The German manufacturers are evidently also endeavoring to increase their exports of pleasure vehicles to Russia, as in the occasional races there have always been a considerable number of German starters. The growing importance of Russia as an automobile market has recently also attracted American firms, who are introducing particularly low priced cars. In St. Petersburg there are at present about 700 cars in use.

#### Fairmount Park Race a Financial Success,

According to the report of the executive committee in charge of the Fairmount Park automobile race, held on October 9, the race resulted in net profits of \$7,617.34, which will be distributed among four Philadelphia charitable institutions. The total receipts handled by the executive committee were \$11,735.41, and the gross expenses amounted to \$4,118.07. The four institutions are the Pennsylvania Society for the Prevention of Tuberculosis, the Children's Aid Society, the Rush Hospital and the White Haven Sanitarium.

#### 1910 Handbook of Gasoline Automobiles Out.

The new edition of the handbook of gasoline automobiles manufactured by the Association of Licensed Automobile Manufacturers has just made its appearance. It is gotten up much the same as in previous years, and contains in addition to the illustrations and specifications of the cars made by licensed manufacturers a list of officers of the association, and extracts from Judge Hough's decision sustaining the Selden patent.

### DESCRIPTIONS OF NEW VEHICLES AND PARTS.

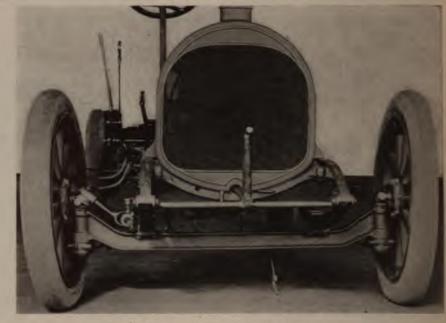
The Royal 1910 Model M.

The Royal Tourist Car Company, of Cleveland, Ohio, for 1910 manufacture a single model, designated Model M, Series II, which is a continuation, with certain alterations, of the Series I built for 1909. Upon this single chassis are mounted various types of bodies, including, besides the standard touring and enclosed models, a close coupled, a semi-racer and a torpedo pattern.

The motor has four cylinders of 5½ inch bore and 6 inch stroke, developing 48.4 horse power, according to A. L. A. M. rating, at 1,000 r. p. m. With the valve setting usually fitted, it gives considerably more at this speed, and varies from 60 to 70 between 1,450 and 1,800 r. p. m.

The cylinders, of distinctive shape, are cast in pairs, and have an inspection cover over each cylinder head. The intake ports are siamesed, but the exhaust passages are individual. The valves are on opposite sides of the motor, taper seated, of 2¾ inches outside diameter, one-half inch stem, are forged solid of nickel steel and work in renewable guides. The intake lift is seven-sixteenth inch, the exhaust three-eighth inch.

The pistons are very light, and carry four one-quarter inch eccentric rings above the wrist pins and one near the bottom to keep oil from working up to the combustion chamber. The connecting rods are drop forged, of H section, and carry a hardened steel bushing 234 inches long, working on a 134 inch hardened wrist pin. The wrist pin fits in taper bearings in the piston, the taper of the two sides being continuous and



ROYAL TOURIST, FRONT VIEW.

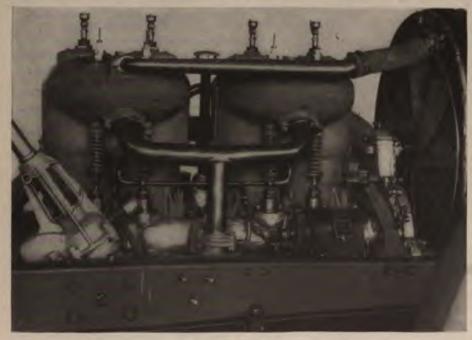
reamed with the same reamer, and is locked by taper pointed set screws, which extend through the walls of the tubular wrist pin.

The crank case, of aluminum, is formed of two halves, with a separate gear cover in front. The upper half carries the crank shaft in three manganese bronze bearing caps, while the lower part serves only as a cover and oil pan. A three point suspension is employed. The motor is supported by two rear arms, carried in semi-spherical sockets, and in front from the centre of a drop forged bridge which spans the frame by a trunnion, which allows a limited mo-

tion to compensate for frame distortion. The crank shaft is drop forged from nickel steel, with a flange for attachment of the flywheel and an extension which carries the clutch. There are three main bearings, the front one 176x334 inches, the centre 2x4½ inches and the rear 2½x3 inches. The connecting rod pins are 1½ inches diameter by 3½ inches long. In addition a ball thrust bearing is fitted to take the thrust when the motor runs with the clutch withdrawn. Parsons white brass bushings are used for all crank bearings. By removal of the oil pan the wear on each bearing can be individually taken up.

The cam shafts are .40 to .50 per cent carbon steel, approximately I inch diameter, and work in long bronze bushings, which are formed with ribs to catch and feed of the front ends are flanged for attachment of the gears, and each shaft, with cams, bearings and gears, is assembled as a unit and introduced into the case from the front. The cam gears have helical teeth, nine normal pitch, and are made of bronze with fibre riveted to the inner web. The crank shaft gear is drop forged, is drawn upon a taper and fastened with a large Woodruff key.

The cams are of 13% inch extreme radis, five-eighth inch face, and fastened to the shafts by Woodruff keys and taper pins. The exhaust cam shaft is offset from the centre line of the valves to allow a quick opening against the explosion pressure without undue side thrust. The cams operate the valves through plungers carrying rollers. These plungers have a sleeve which surrounds roller pin and plunger, and this gives an unusually large amount of bearing



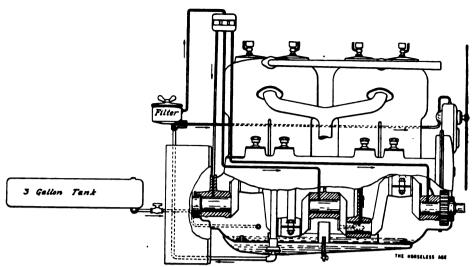
ENGINE INTAKE SIDE.

surface. These plungers are further formed to act as pumps to draw in oil mist from the crank case, and on the up stroke to project it down upon the bearing surface of the roller pin and bronze plunger guide.

The fan is 20 inches diameter, stamped in one piece from No. 16 gauge aluminum, and is driven through an idler from the intake cam shaft gear at one and two-third times engine speed. Both idler and fan gear run on imported annular ball bearings, and in addition a ball thrust bearing opposes the propelling action of the fan. A small adjustable single disc clutch construction saves the gear from excessive inertia stresses.

A large centrifugal water pump, assembled and attached as a unit, is located on the exhaust side of the motor at about the centre, and is driven by gears from the exhaust cam shaft at twice engine speed. The water is forced into the cylinder opposite the exhaust valve seats, and taken out above the intake valve seats, the flow around the cylinder barrels being mainly due to thermal variations in density. The square tube radiator is of circular shape. which is the distinguishing mark of the Royal Tourist. It stands on leather pads on the front channel cross member of the frame, to which it is attached by two studs, and is also supported from the dash, from which it is braced by a one-half inch rod inside the centre hood hinge. An oval filler is fitted.

The oil circulation system is not unusual, except in the incorporation of a real filter in the line from pump to motor bearings. As shown by the diagram, the oil in which the connecting rods dip is held at a constant level, the excess overflowing to a chamber beneath, from which a gear pump forces it through the filter, thence through sight feeds on the dash to the main crank shaft bearings. A check valve on the filter keeps a constant pressure and allows a bypass stream, which continuously floods the time gears and their bearings. As the oil fed to the main bearings escapes at the ends, it is caught by oil catchers attached to the crank webs and impelled by centrifu-



ROYAL ENGINE, SHOWING SYSTEM OF LUBRICATION.

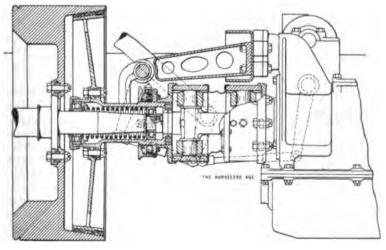
gal action to both upper and lower connecting rod bearings. All bearings in the crank case are arranged to collect the splash and to run safely on this alone in event of the exhaustion of the extra oil supply. To prevent any such occurrence a 3 gallon tank is carried beneath the footboard at such a level that turning a cock will allow it to flow into the crank case. To prevent waste felt washers and packing nuts are provided at all points where a rotating shaft projects from its casing.

The dual ignition system comprises a Bosch D-4 magneto with single non-vibrator coil and storage batteries. Instead of the usual method of magneto timing, the low tension breaker is locked at the point where the maximum potential is developed, and the time of spark in relation to the motor is regulated by sliding a shaft with spiral teeth through the gear which drives the magneto. This allows a full hot spark when the motor is running with the spark retarded or under low throttle. An encased Oldham coupling takes care of any maladjustment in case of a replacement of a repair. A small flywheel on the magneto spindle decreases the strains on the gears; also their noise. The machine is mounted in a most accessible position, and can be

removed in a minute by loosening the straps which hold it down.

The carburetor of this engine is the development of many months' experimental research. It is very simple, consisting of an L shaped air passage water jacketed, a butterfly throttle, a float chamber and spray nozzle, with a by-pass from the lowest part of the L through the water jacket past the throttle to take up the liquid gasoline when running slow. The lower part of the air passage is formed in accordance with the principles which underlie the action of the well known Venturi tube, but its efficiency is said to be such that, with a given flow of air, the fall of pressure at the nozzle is about twice that of the Venturi tube shapes in common use. This gives vaporization at a lower speed, and better vaporization at a higher speed, and it further decreases the relative effect of the conditions which retard the flow of gasoline (under a small head) to such an extent that the proportion of gasoline and air is substantially constant for all demands of the engine. A small slot, which at its widest admits about 9 per cent. of the total air supply, is regulated by a button on the dash, and forms the only means of adjustment provided.

The flywheel is cast from gray iron, is 17 inches in diameter, weighs 144 pounds and is attached to the crank shaft flange by eight nickel steel bolts and four annular dowels. The cone clutch, used continuously by this company since 1904, is continued, with the addition of cork inserts. The cone is 1534 inches in diameter, 8° taper on each side, and is faced with leather 21/4 inches wide. Small flat springs of greater radius than the cone are attached by their centres around the outer edge under the leather. and raise it slightly to give gradual engagement. This clutch cone is attached by nickel steel bolts and annular dowels to the drop forged clutch sleeve, which slides and rotates on ball bearings supported by a 1 to inch diameter extension of the crank shaft, and is thus centred accurately and rigidly. The connection between clutch sleeve and transmission is by a short shaft with square trunnion blocks at each end, working in-



ROYAL CLUTCH AND UNIVERSAL JOINT.

divided on a horizontal plane through the

side of drop forged flanges. By removing these flanges and one retaining screw the clutch may be removed entire. Throughout the transmission line on this car, from crank shaft to rear axle, the power is passed through flanges bolted with nickel steel bolts and circular dowels, or through large, hardened blocks working at a considerable radius. And while all joints are enclosed and packed in grease, means are in every case provided for forcing lubricant directly to the bearing surfaces.

The transmission gives four forward speeds and reverse, the ratios being, respectively, 1, .74, .45, .22, .16. Chromenickel alloy steels are used, high carbon for the shafts and low for the gears. The annular bearings used are of large size, and all of well known German makes. On the countershaft the gears are bolted to flanges or fastened on a ground taper with nickel steel keys. The main shaft, on which the gears slide, is of 13% inch outside diameter, and is formed with six integral keys. The countershaft is below the main shaft, suspended from the upper half of the crank case by manganese bronze caps and nickel steel bolts. An oil pan without openings covers shaft, caps and all, allowing a great depth of oil to be carried without leakage. Stuffing boxes are provided at the two upper bearings, through which oil might escape. The case has two arms at the rear, which bolt to a cross member of the frame. and in front hangs from another cross member by a cylindrical trunnion, whose axis is parallel with the propeller shaft. The arrangement is such that without removing the body from the car the case can be completely disassembled in place or dropped down entire.

The propeller shaft, of 1½ inch diameter, is forged from 3½ per cent. nickel steel, with a universal joint member integral at each end. A carbon joint is used in front, a block and trunnion in the rear. Both are large and carry means for constant lubrication.

The rear axle, of the full floating type, is formed by bolting two flanged nickel steel tubes to a central cast steel casing, and is

centre line. The upper half is readily removable, and permits easy inspection or complete disassemblage without taking the axle from the car. The bevel pinion, of chrome-nickel steel, formed integral with its shaft, is supported by Timken roller bearings at each end, as well as a ball thrust of good size. The standard touring car gears are four pitch, of seventeen and forty-six teeth, respectively, which ratio gives 39 miles per hour at 1,000 revolutions of the motor. The differential is made up of bevel gears, has four pinions of 5 per cent. nickel steel, and differs from prevailing designs in the manner in which these pinions are located. By making the outer bearing seats for all the pinions part of one continuous spherical surface, they are all machined simultaneously in a lathe fitted with a rotating tool post, and thus are finished much more easily and accurately than if each bearing were milled or back counterbored. The differential case halves, drop forgings, are carried by big annular ball bearings, with ball bearings of the common type for gear thrust. The driving axles are 15% inches in diameter, of chromenickel steel; they receive the drive from the differential gears through integral keys, and deliver it to the wheel hubs by toothed flanges formed in one piece with the shaft. The hubs are drop forged from carbon steel and specially heat treated. The stamped steel brake drums are of 16 inches inside diameter, 4th inches deep, and form the hub flange. The fourteen 134 inch spokes are dished t degree from hub to felloe, and in addition to the wheel bolts are held by slips which pass around them near the outside of the brake drum. The hand brake and foot brake are located side by side in each wheel, and have rolled manganese bronze shoes 13/4 inches wide, giving a total braking surface of 182 square inches. The cam expanding these brakes is mounted with a certain freedom endwise, so that if either front or rear segment should seize first, due to the motion of the wheel, the whole expanding effort can act on the segment not yet tight. To equalize the brake

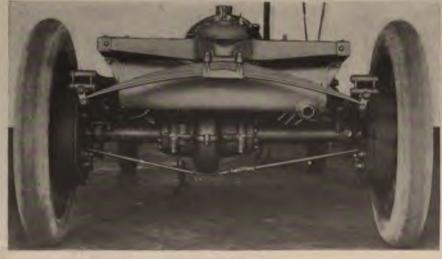
application on each wheel the brake cross rods in the frame each carry a small differential similar in type to that in the rear axle, with but one pinion, and with teeth cast to shape, contained complete in a greasetight case.

The brake adjustment is unusual, and rather more difficult to describe than to operate. The brake segments are an-

rather more difficult to describe than to operate. The brake segments are inchored on bolts that are free to move in slots of constant radius in the anchor plate casting, which bolts are held by the claming action of corrugated face washers when their nuts are tightened up. The bolts for each pair of segments are connected by a right and left screw, to be rotated by a small worm which can be turned with a screw driver, reaching through a hole in the outer face of the brake drum. To adjust, the rear axle is jacked up, the clamping nuts are loosened, and the brake lever is set in the position desired when the brakes should be tight. The small worm is then turned right handedly with a screen driver until the wheels lock; then the bolts are clamped in the new position.

The driving and braking reactions are elaborately provided for in a construction originated and patented by the Royal Tourist Car Company. In this a torque rod attached to the rear axle case restrains the pinion from rotating around the gear, while strut rods attached to the brake hangers. which are free on the axle tubes, take all braking strains and also transmit the drive from the rear wheels to the chassis. The torque rod is a nickel steel stamping of lattice form, while the strut rods are drop forged with I section. Both these pivot on a vertical axis at the axle, to allow slight lateral motion, and both have ball joints at the forward end, the torque rod ball being enclosed in a spring buffer. All joints have large hardened surfaces, with provision for lubrication, and, it will be noted, are so designed that the axle may rise on one side and fall on the other without generating clamping or twisting strains. This construction saves the axle from all torsional stresses, allows the rear springs complete freedom of motion, and gives a flexibility on rough roads which fully justifies its extra

The front axle is what may be termed an inverted Lemoine type, was first built by this company in 1906, and is adopted as given ing a low frame, large spring clearance and simple strong shapes for axle forgings. The axle bed is forged entire from medium carbon open hearth steel, is I section, 3 inches deep by 2 to inches width of flanges; flanges and web three-eighths of an inch thick. A sample forging under test required 19,000 pounds, applied at the spring seats, to produce permanent set. The knuckles, in shape like an inverted L, are forged from nicks steel, and turn in the axle on an anti-friction bearing of three-sixteenths of an inch tool steel rollers. The direct weight on the knuckles is taken by ball thrust bearings with three-eighths of an inch balls. The hubs, worked out of drop forgings, are car-



REAR VIEW.

ried on Timken roller bearings. An eight pitch gear is cut integral on the right hand hub flange to drive the speedometer gear. The knuckle and hub are formed to receive an aluminum housing which completely protects these gears from dust and flying stones. All levers and connections which control the direction of the car are nickel steel forgings of somewhat greater proportions than ordinary, and are specially heat treated and tested to insure against failure from any cause. All joints bear grease cups, with holes leading direct to the working parts, and are equipped with leather boots as a protection from water and dirt.

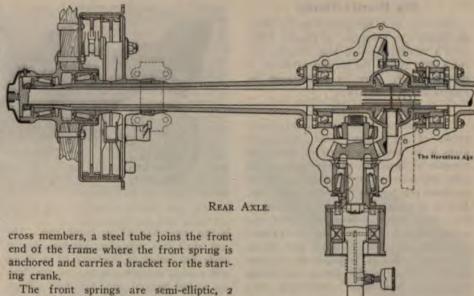
The reach rod ball joints differ from the common style in having the lever fork over the rod, with a nickel steel bolt passing through the lever, rod and ball, so that no amount of wear on the ball sockets will permit the rod to disconnect. These balls have large surface, being 11/4 inches in diameter, and work under the cushioning effect of springs contained in the rear end of the reach rod. The steering cross rod is behind the axle, and being in compression is 11/4 inches in diameter, three-sixteenths of an inch wall, heat treated, steel tubing, and is made adjustable for length.

The steering control is effected by a worm and sector, the sector being used in preference to a full gear on account of the greater radius that the same space will allow. The sector is bolted with annular dowels around the nickel steel bolt to a semi-flange forged integral on the sector shaft, which forging extends down as the lever arm.

Ball thrust bearings are used and nonadjustable plain bearings of hard bronze, each with an individual grease cup lead.

The steering wheel is of Circassian walnut, 181/2 inches in diameter, and totally encloses the rim of the aluminum steering spider, which is attached to a flange on the steering column by six bolts. The throttle and spark levers are in the centre of the wheel, and instead of the common metal ratchet are held by an arrangement similar to a single disc clutch. The levers are steel stampings, and have as their centre a disc 21/8 inches in diameter, around the exterior of which are a number of fibre plugs oneeighth inch in diameter and about threesixteenth inch thick. The throttle lever sits at the bottom of a small brass casting, next a metal plate or washer; on top of this the spark lever, and another plate; then a star shaped flat spring, which is compressed by the cover and furnishes the frictional force.

The frame is stamped from three-sixteenth inch nickel steed, heat treated, and is of 51/2 inches greatest depth, has 2 inch flanges, which gradually increase to about 334 inches at the flywheel and is raised 31/2 inches in the rear to give room requisite for comfortable spring action. The rear cross member is expanded out at the centre in a distinctive shape, to carry the rear cross spring underneath, and receives inside diagonal braces leading to either side of the frame. Besides three other channel



inches wide by 40 inches long, with six leaves. The rear side springs have shackles

at each end, are 21/4 inches wide, 50 inches long, with seven leaves, while the cross spring is 381/2 inches in length, same width and number of leaves. Care has been taken in the design to secure extreme axle clearance, and this with rubber buffers to protect against unusual shocks allows the use of springs of exceptional flexibility. The spring clips used are of a type originated by this company. A single box shaped forging having four legs and bearing on the sides as well as on the top is used for each spring. The rigidity of this form is further increased by making it of nickel steel. Bronze pads are carefully fitted above and below each spring at the clip to insure the positive bearing on the clamps, which prevents breakage. The spring shackle bolts are fastened so that they rotate in the spring eyes instead of the shackles, and either have grease cups on the heads or are provided with leads for a grease gun nozzle. The spring clip nuts, brake adjustment pins, and all such parts which might rust tight, are sherardized, a process similar to galvanizing but penetrating somewhat deeper.

An aluminum under pan extends from the radiator to well back of the transmission, and is divided longitudinally in three parts, the two sides being bolted to the frame, while the centre may be lowered by unbuckling three leather straps. The fenders are flat across their tops, but are very similar in outline to the ones used this present season. An aluminum pan across the frame reaching from the radiator to the very front crossbar completes a protection from mud and dirt which extends from front to rear. A flat wooden dash of Circassian walnut, almost severe in its outlines, replaces the curved dash which has helped to identify the Royals of the past five years, and carries simply a cylindrical, non-vibrator coil, a small three lead oil gauge, and a button controlling the carburetor adjustment. A muffler cut-out, opened by a pedal button, and an accelerator pedal are fitted.

All the pedals work through holes, not slots, in the footboards, and as these latter are covered with aluminum matting, also used on the running board, this part of the car is always neat and clean.

The gasoline tank holds 30 gallons, is located under the front seat, and is filled through a spout in the front seat division. In the upper part of the front is a reserve supply, which is turned on or off by a valve behind the driver's foot. The way of filling the reserve supply tank is very simple, yet insures a filled tank at all times to fall back on. A small spout leading to the reserve tank is located inside the main filling spout and some 4 inches below the top, and in such a position that it is impossible for the gasoline to flow past into the main tank without a portion of it flowing into the reserve. A two-way cock makes it impossible to draw from the main tank and the reserve at the same time, and thus depleting both supplies.

### Stafford Motor Car Company to Move from Topeka to Kansas

City.
The Stafford Motor Car Company has been organized at Kansas City, Mo., with a capital stock of \$100,000, and will begin operations in the building of the Bower Machine Works, at Eighteenth and Wyandotte streets, about January 15. The organizer of the new company is Perry Stafford, who was formerly superintendent of the Smith Automobile Company's plant in Topeka, Kan., and more recently manager of the Stafford Motor Car Company of the same city. The new company has taken over all the machinery and designs of the Stafford Motor Car Company of Topeka, and the assets will be moved from Topeka to Kansas City some time during January. The company will build the same car that Mr. Stafford has been building at Topeka for the past two years. A number of Kansas City capitalists have joined Mr. Stafford

#### The Everitt Thirty.

This new car is the product of the Metzger Motor Car Company, of Detroit, Mich. It is a moderate priced four cylinder machine, and shows the careful attention to details usually given by experienced designers and manufacturers.

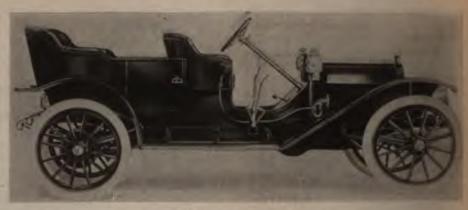
#### THE MOTOR.

The motor has a bore of 4 inches and a stroke of 434 inches. This long stroke gives it an unusually powerful torque for a motor of its rating, 30 horse power. All four cylinders are cast together, as is now accepted practice for motors of this size. But in this instance the block casting is even more comprehensive than usual, and comprises both the inlet and the exhaust manifolds and also the upper half of the crank case. Recent developments in foundry work and in the repair of castings have made this rather complicated block casting practical.

The valves are in pockets all on one side, operated from a single cam shaft. The pockets are closed by screw plugs. The exhaust manifold is above and the inlet below. Connection to the carburetor is made by a flanged pipe which passes between the second and third cylinders. There is ample water space between all adjacent cylinders and all around the valve seats. The top of the jacket is covered by a gray iron plate which has the water outlet pipe cast integral.

A further extension of this cover toward the front carries the fan. This fan bracket is made in the form of a clamp which grips a vertical rod that is forged integral with the spindle on which the fan turns. By sliding this rod up or down the tension of the fan belt may be adjusted. The radiator is of the vertical tube type. The radiator proper is contained in a stamped sheet steel casing which may be removed should repairs become necessary. This casing is enameled royal blue. The water circulating pump is of the centrifugal type, gear driven.

The valves are operated in the standard manner by push rods leading through bosses



THE EVERITT "THIRTY."

in the upper half of the crank case. The cam shaft has only two bearings, but is made 11/4 inches in diameter so as to be stiff enough to work quietly. All the cams are forged integral with the shaft. These large diameter cams give quiet valve operation.

The crank shaft is of the three bearing type, and is bushed with nickel babbitt. The bearings are suspended directly from the cylinder crank case unit, and their caps are entirely separate from the bottom portion of the crank case, which is merely an oil reservoir. This oil chamber is of cast aluminum.

Lubrication is by the splash system. The oil level is maintained at a constant height in the crank case by a supply from a sheet metal tank which is located close to the water jacket of the two middle cylinders. Oil flows from this tank by gravity, and the rate of flow is automatically regulated by the rising level of the oil, which closes the only opening to this air tight oil tank when it reaches the required height.

Ignition is by jump spark, the plugs being located in the caps above the valves. Current is supplied from two sources, viz., battery and magneto. The wires are neatly secured in insulating tubing. The coil box is fastened to the front side of the three ply mahogany dash.

THE CLUTCH.

The inside of the rim of the 16 inch

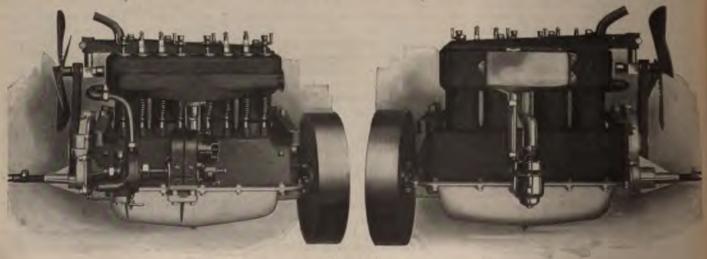
flywheel is turned conical to fit the male member of the clutch. This latter is of aluminum, faced with chrome tanned leather, two inches wide. Under this leather are a number of plungers which are pressed against it by springs, to give gradual engagement. Clutch engagement is secured by a 200 pound spring. The pedal leverage is so arranged that only as pounds foot pressure is required to release the clutch.

#### TRANSMISSION.

The change gear is on the rear and. It is a standard sliding gear, giving three speeds and a reverse. From the front of its case a tube leads forward to about the middle of the car. To the forward end of this tube is secured a strong fork. This fork is free to turn on the tube, but cannot slide endwise. It is hinged to the frame and transmits both driving and braking strains. This torsion tube contains the propeller shaft, which has a single universal joint, centering with the fork movement. A short shaft with another universal joint at its forward end connects with the clamb

AXLES AND SPRINGS.

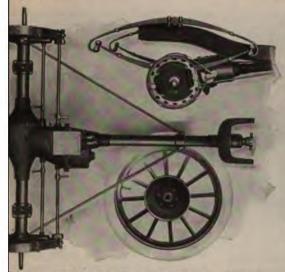
The rear axle casing is made up from steel tubes and cast steel gear houses fastened together by pressing and riveling. It has a truss underneath and the propellar shaft housing tube is connected to the axis tubes by diagonal struts. The bevel driving gears have a standard ratio of 3½ to 1.



MAGNETO SIDE.

EVERITT ENGINE,

CARBURETOR SIDE



TRANSMISSION AXLE, REAR WHEEL AND SPRING.

front axle is an I section forging, of the Elliott type, with a slight drop en the springs. The springs are seto the axle by large clips with wide all portions.

front springs are of the semi-ellipttern, 34 inches in length, with seven There is sufficient space between and frame to permit a 4 inch den. The rear springs are of the full c pattern, with full scroll shackled They are 36 inches long and have ach opening. At the bottom they are ed to seats which surround the axle have collars at each side to prevent se movement. Above they are fastto brackets riveted to the frame. frame is of pressed steel. It has a e drop which brings the centre of y of the loaded car low and at the time maintains ample road clearance. ear drop is 51/2 inches and the front is 3 inches. The channel is 13/4x4 The width is 30 inches. The motor ried on two drop forged I section pars: The road clearance is 111/2

#### STEERING AND CONTROL

esteering is on the right hand side, the eing set at a rakish angle. The wheel inches in diameter, and has the spark hrottle levers placed below it con-

to the operator's left hand, ear is of the worm and secpe, and is cross connected to ght knuckle. The cross conn between the knuckles and her parts of the mechanism aced high enough and to the of the axle so they are profrom accidental injury.

r shifting is by a sliding lever working in an H plate. haft for this hand lever carwo jaw clutches, which enwith levers mounted on a ton the central cross memthe frame. These are condirectly with the gear shifteds on the rear axle. The grods are furnished with

spring pressed plungers, which fit in notches in the rods and lock the gears in engagement. There is also a ball interlock between the rods, which prevents more than one being shifted at a time.

Both sets of brakes act directly on the rear wheels. The expanding brakes have metal to metal contact. The contracting brakes are faced with asbestos fabric. All the brake rods are brought inside the frame, and all the pulls come straight along the rods, so there is no chance for binding.

The wheels are of the wood artillery type. The

rear have twelve spokes and the front ten. They are equipped with 3½x34 inch tires. The tread is 56 inches, and the wheel base is 110 inches. The front wheels have plain ball bearings, the rear axle has Hyatt and Timken roller bearings.

#### BODIES.

The five passenger touring body is unusually large, with generous doors and ample foot room in the tonneau. The inside width of the tonneau seat is 52 inches. The usual styles of runabout and small tonneau bodies are also furnished. Mud guards and running boards are of pressed steel, and there are pressed steel shields between the running board and frame sides. The height of the door sill from the ground is about 28 inches under load.

Great care has been taken to insure reliable lubrication of small parts, grease and oil cups being liberally supplied. Magneto, generator, horn and a full equipment of gas and oil lamps are included in the regular price of the car.

#### Milwaukee Automatic Spring Bumper.

The Garage Equipment Manufacturing Company, of Milwaukee, Wis., have placed on the market an automobile bumper which they term "automatic," since it is unnecessary to drill holes in the frame or to change the spring shackle bolts in order to attach this bumper to the car. The bar itself is of steel and covered with a seamless brass tube. The arms which hold this bumper cushion on brackets which are clamped to the front portion of the frame. In other words the thrust of any shock is

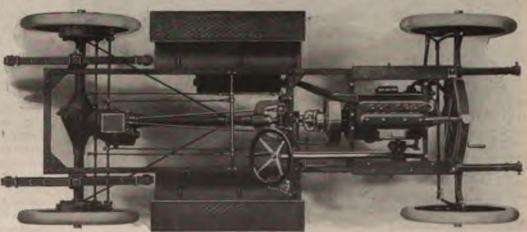


MILWAUKEE AUTOMATIC SPRING BUMPER.

on the end of the frame, and not on the spring hanger bolt. This bracket is clamped above the spring shackle end, and back of and below the frame. It is so arranged that it can be elevated or lowered to any desired position.

#### New Firestone Tire Plant.

Plans are being prepared for an entirely new plant to be erected by the Firestone Rubber and Tire Company, of Akron, Ohio. The company has recently acquired a large site beyond the railroad tracks on South Main street, where the plant will be erected. When the new buildings are completed the company will employ 3,000 men. L. E. Sisler, of Detroit, treasurer of the company, made the important announcement at Akron recently. The capacity of the plant will be trebled. At present the concern, which is one of the largest tire plants in the country, employs 1,400 people. Officers of the company are: H. S. Firestone, president and general manager; William Christy, vice president; S. G. Carkuff, secretary, and L. E. Sisler, treasurer.



EVERITT THIRTY, PLAN OF CHASSIS,

#### Franklin 1910 Models.

The H. H. Franklin Manufacturing Company for the season of 1910 will again produce three different types of chassis, with sixteen different styles of bodies. Two of the chasses are equipped with four cylinder motors and one with a six cylinder motor. The smallest chassis is the Model G, which has a four cylinder, 18 horse power motor of 33% inch bore by 4 inch stroke. Model D has a four cylinder, 28 horse power motor of 41/4 inch bore by 4 inch stroke, and Model H has a six cylinder, 42 horse power motor of 41/4 inch bore by 4 inch stroke. All of the motors are air cooled and comprise the several distinctive features introduced by the Franklin Company in recent years, such as concentric valves in the cylinder heads and auxiliary exhaust ports.

The most important innovation in design in this year's models relates to the method of cylinder cooling. The cylinders are now cast with vertical sheet steel flanges approximately I inch high, which are surrounded by a sheet iron cylinder or air jacket. The jackets are open at the top, and at the bottom are joined to a sheet metal division plate extending all across the engine space from one side frame to the other, and from the front cross member of the frame to the dashboard. Underneath the engine is placed the usual sod pan, which at its rear end is shaped so as to fit closely around the flywheel. The latter, which is 20 inches in diameter on Models H and D, forms a sirocco fan and draws air through the air jackets around the cylinders. By this method of air circulation the cooling effect is equal for all cylinders and all around each cylinder. It has been found that when the car is being driven on the road there is always a slight excess pressure of air in the hood above the division plate, this being shown by the fact that the hood is lifted by



FRANKLIN 1910 FOUR PASSENGER, 18 H. P. TOURING CAR.

the air pressure unless it is fastened down. The front fan has been entirely done away with, which makes the engine slightly more accessible, besides doing away with the separate fan drive. The bonnet opening in front is covered by grill work, the same as in former years, through which the air enters. One feature of this cooling system is said to be that the engine and the accessories in the bonnet space remain almost absolutely free from road dust.

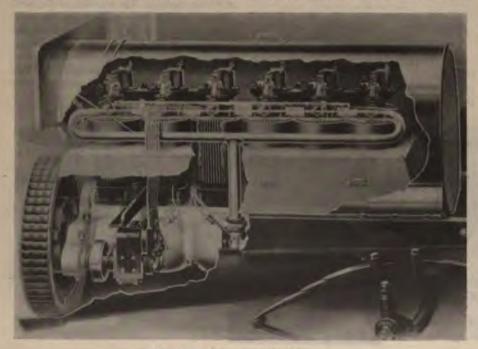
Aside from the change in the cooling system the engine remains practically the same as in previous years, the concentric valves and auxiliary exhausts, its most characteristic features, being retained. The crank shaft is supported by bearings between each pair of throws, which bearings are lined with die cast babbitt bushings. The crank chamber is of the barrel type, with end plates or cheek pieces containing the end bearings. All screws and nuts inside the crank chamber are made of nickel steel, and are positively locked in place.

The carburetor has not been changed, except that it is now primed from in front of the car instead of from the dash. It has both a hot air inlet and a cold air inlet, the former being closed in summer time by means of a butterfly valve. The hot air is drawn in through a jacket around a portion of the exhaust manifold. At the bottom of the carburetor there is a combined gasoline strainer and water separator.

Ignition is effected by means of a Bounhigh tension magneto, which is located to the right hand side of the motor toward the rear, in a very protected position. The spark lever has this year been done away with on all models, but on two of the models a centrifugal governor is provided, which automatically retards the spark when the speed of the vehicle drops below 12 miles per hour. Above that speed the spark point is fixed. The magneto is the only source of ignition current, this arrangemen having proven entirely satisfactory during the past year.

The engines are lubricated by means of a mechanical oiler which is gear driven from the cam shaft. This oiler on the six cylinder model has six leads. No. 1 lead goes to the forward bearing of the engine and then drains into No. I pocket of the crark case. Lead No. 2 goes to No. 1 crank case pocket; lead No. 3 to No. 2 crank case pocket; lead No. 4 to No. 4 crank case pocket, skipping pocket No. 2; lead No. 5 goes to crank case pocket No. 5, and lead No. 6 to the rear engine bearing and from there drains to No. 6 pocket. In addition to the mechanical oiler a plunger pure oiler is provided on the dash of the or It draws its supply of oil from the tank of the mechanical oiler and forces it to the forward crank case compartment. This our is used when long, steep hills have to ke climbed, when the oil in the crank see drains toward the rear and the forward cylinder has a tendency to run dry. The oilers on Models D and G have a capacity of 3 quarts, and that on Model H has a capacity of 1 gallon.

The gasoline tank is made of sheet copper and placed in the front seat. An auxiliary tank is provided which gives a warning to the driver when the fuel supply is neuring exhaustion. The auxiliary tanks have a capacity of 2 gallons on all except the runabout models, on which they are of 1% gallons capacity. The main tanks have



CUTAWAY VIEW OF 1910 ENGINE.

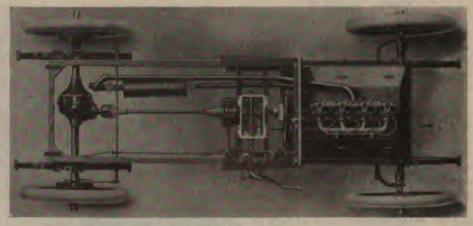
the following capacities: Model H, 17 gallons; Model H runabout, 13 gallons; Model H limousine, 15¾ gallons; Model D, 12¾ gallons; Model D runabout, 13 gallons; Model D landaulet and limousine, 15¾ gallons; Model G, 12¾ gallons, Model G runabout, 13 gallons.

The former type of multiple disc clutch is retained on this year's models. A selective three speed transmission of the company's own make is now used on all models. All of the pinions and gears are made of 3½ per cent. nickel steel and are worked out of solid stock. The gears have only five-eighths of an inch width of face and the gear-box is unsually compact.

The drive on all Franklin cars is by shaft and bevel gears. The gear ratios for the different models are as follows: Model H, 3½; Model D, 35-7; Model G touring car, 41-6; Model G runabout, 35-7. The axles on Models D and G are of the semi-floating type and that of Model H is a regular live axle. The propeller shaft and rear axle shafts are of 3½ per cent. nickel steel.

In the construction of the axles on the 28 and 42 horse power models no brazing is done, the parts being first pressed together and then cold riveted, which makes a positive joint. Timken roller bearings are used on the front axle and Hess-Bright annular ball bearings on the rear axle. The front axles on the 28 and 42 horse power models consist of 21/2 inch nickel steel tubes with yoke type steering heads. The steering knuckle arms are forged separate from the knuckles and are fitted to the latter with a taper and key and drawn up with a nickel steel castle nut. The Franklin Company this year uses its own design of worm steering gear on all models. The steering hand wheels are 17 inches in diameter. There is only one finger lever on top of the steering wheel, that for the throttle.

The frame is made of laminated white



PLAN VIEW OF CHASSIS.

ash sills, as has been the Franklin practice for many years. Full elliptic springs are used all around, secured underneath the axles, those on Model G being 36 inches in length and those on Models D and H 40 inches. The wheel base is 127 inches on Model H, 106 inches on Model D, 1111/4 inches on Model D landaulet and limousine, and 911/2 inches on Model G. A rather noteworthy feature of this year's Franklin line is the large tires fitted to the different models. The sizes are given in the following table:

Model H, 36 inches by 41/2 inches front. Model H, 37 inches by 51/2 inches rear.

Model H Limousine, 34 inches by 41/2 inches front.

Model H Limousine, 35 inches by 5 inches rear.

Model D Limousine, 36 inches by 4 inches front.

Model D Limousine, 36 inches by 41/2 inches rear.

Model D Landaulet and Limousine, 34 inches by 43/2 inches front.

Model D Landaulet and Limousine, 35 inches by 5 inches rear.

Model G Landaulet and Limousine, 32 inches by 31/2 inches front.

Model G Landaulet and Limousine, 32 inches by 4 inches rear.

Quick detachable tires are fitted exclusively, and no provisions are made on any of the models for carrying spare tires, as it is claimed that the unusually large size of the tires, combined with the light weight of the car, makes this unnecessary.

All of the cars are fitted with double acting Raymond emergency brakes on the rear wheel hubs, which are operated by a brake lever at the side of the driver's seat. These brakes are 16 inches in diameter and have 2½ inch faces. A double acting Raymond service brake is fitted to the transmission drive shaft and is operated by a pedal. The latter brake is of small diameter but large width—4 inches. Neither of the brakes is interconnected with the clutch.

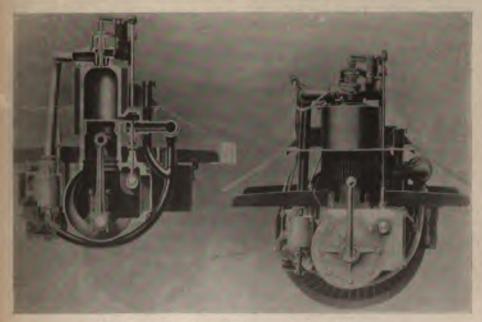
The Franklin bodies are made of sheet aluminum riveted to continuous steel angle frames. All bodies are ironed for tops. Models H and D are provided with luggage carriers. The equipment includes two oil side lamps, one rear lamp, two headlights, Prest-O-Lite tank, horn, complete tool equipment, jack and automobile cover.

#### "Silent Sioux" to Be Manufactured in Waukesha.

The Silent Sioux Automobile Company has recently occupied the factory formerly used by the Waukesha Motor Company, Waukesha, Wis. R. J. Wells, an attorney of Sioux Falls, S. Dak., is president of the company and T. L. Fenwick general manager. The car to be manufactured, which is to be known as the "Silent Sioux," is a five passenger touring car, rated at 40 horse power, and is to sell at \$3,000. It has been built at Sioux Falls, S. Dak., for some time. The Waukesha motor is being used.

#### Moyer Factory to Open First of the Year.

Harvey A. Moyer, a prominent carriage manufacturer of Syracuse, N. Y., whose intention to enter the automobile manufacturing business was first announced in The Horseless Age in August last, will open his new plant, specially erected for the purpose at an expense of \$50,000, on January 1 next, and expects to turn out 200 cars next year.



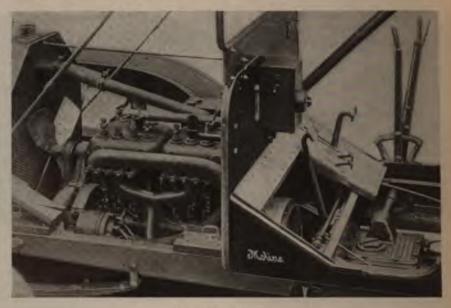
CROSS SECTION OF ENGINE SHOWING AUXILIARY EXHAUST.

#### Moline Model M.

The Moline Automobile Company, East Moline, Ill., have recently made announcement of their new 1910 Model M, which sells at \$1,500. Some minor changes have been made, but the car remains in general the same as last year.

The motor is a four cylinder, four cycle, water cooled one, with the cylinders cast in pairs, with valves all on one side. The water jackets are very spacious, and entirely surround the whole upper portion of the cylinder, with the water outlet located midway between the cylinders in each pair, where the water would be the hottest. The thermo-siphon cooling system is employed, and the water connections are of very liberal size, as required by this method of circulation.

The cylinders are of 4 inch bore and 4½ inch piston travel. The piston is long and provided with three compression rings above the hollow piston pin. The piston pin bearing is of phosphor bronze. The valves are mushroom type, and actuated through roller lifters in bronze guides by the cams. The valves have 45 degree seats and are 35 per cent. nickel steel. The



FRONT OF CHASSIS.

one in front, the latter on the cross member on which the fan bracket is carried.

The crank case is in two pieces, the upper portion containing the crank shaft bear-



Model M, 30 H. P., Four Cylinder Moline.

cylinders, pistons, piston pins, valve seats, cam shaft and crank shaft are all finished by grinding.

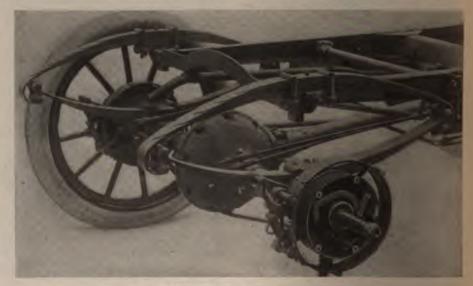
The connecting rod is drop forged, and is fitted with a phosphor bronze bearing at the top and nickel babbitt bearings at the bottom. The crank shart is also drop forged and heat treated; it has three liberal main bearings, which run in nickel babbitt bearings.

The cam shaft and magneto gearing is enclosed in an oiltight compartment. The exhaust and inlet manifolds, which are located on the left hand side of the motor, are held in position by two clamps and four studs, making either readily removed. The placing of the exhaust, inlet and magneto all on one side leaves the whole other side for the force feed oiler, which supplies the several main bearings of the crank shaft, as well as the connecting rod dip pockets, with lubricant. The flat belt driven fan is carried on an adjustable eccentric bracket on the front cross member of the frame.

The motor, clutch and transmission are all contained in a single unit with three point suspension, two points at the rear and ings and inspection plates, through which the connecting rod and crank shaft bearings may be examined. To the rear end of the crank case is attached a yoke member,

which embraces the flywheel and rigidly connects the change gear case with the crank case. The clutch is a standard leather faced cone with cork inserts, all working parts of which are fully housed and protected. It is so designed that it can be removed from the chassis upon the removal of the floor boards without disturbing any other part of the car. It transmits to a three speed gear of sliding type, in which the changes of gearing are secured selectively by a side lever. All gears are of nickel alloy, in an aluminum case, with both shafts carried on Timken bearings. A large hand hole is provided in the cover of the gear case for inserting lubricant, or for inspection.

The drive to the rear axle is through an enclosed propeller shaft, with a single universal joint. The centre of the cross of the joint lies in the plane of the torque tube yoke above mentioned, thereby protecting the joint from torque strains. The propeller shaft runs on New Departure ball bearings, and all shafts in the rear axle



MOLINE REAR CONSTRUCTION.

construction are carried on roller bearings, with ball thrust bearings to take up the end

The front axle is drop forged, heat treated, of I section. The steering knuckles are carried on heavy pivots with bronze bushings.

The front springs are semi-elliptic, 42 inches long, and the rear springs full scroll elliptic. In order to prevent side sway due to the use of these the axle tubes are guyed from each outer end by tubes to the casing containing the universal joint. The frame is of pressed nickel steel and fitted with radius rods, which take all the driving strains, thus relieving the springs of this load.

Spark and throttle control levers are located on a stationary quadrant above the steering wheel The gear shifting lever is arranged so that from the neutral position it can be thrown in high or second without shifting lever sideways. Low speed is obtained by the usual method of shifting the lever sidewise. The emergency brake lever applies the brakes and disengages the clutch at the same time. The steering gear is a worm and sector. Brakes are external contracting and internal expanding, operated by the usual method and acting on rear wheel brake drums.

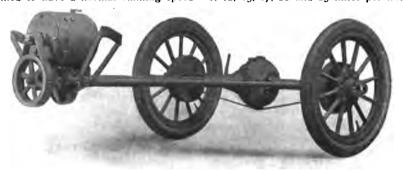
Sixteen gallons of gasoline is carried in the tank under the front seat, and is supplied to the carburetor by gravity. A Splitdorf magneto is used in connection with batteries, with a single coil on the dash. Provision is also made for a timer, if it is desired.

Every car comes equipped with two gas headlights, with generator, two side oil lamps, one oil tail lamp, horn, robe rail, and full tool equipment. One special feature of these cars is that the tonneaus are all detachable. The chassis can be had with baby tonneau, touring car, single rumble roadster or a beetle back roadster body, all models having 110 inch wheel base.

#### The Ohio Electric Model D.

The Ohio Electric Car Company, who recently began the manufacture of shaft driven electric pleasure vehicles in the Milburn wagon plant in Toledo, Ohio, have just bought out an electrically driven coupé known as Model D. This car has a combination wood and steel frame, the object being to secure stiffness and thus reduce the strains on the closed body to a minimum. The makers are prepared, however, to furnish a regular pressed steel frame to any who may prefer it. The car is claimed to have a normal running speed

eral Electric motor of unusually large size. with aluminum heads and Hess-Bright ball bearings, is used. The motor is supported from the frame by means of a cradle. It drives through an enclosed silent chain directly to the propeller shaft, which is enclosed in a tubular housing acting as torque rod. Universal points are entirely avoided in the drive. Two diagonal brace rods run from the cradle to the rear axle housing to hold the latter in alignment. The motor is controlled by a continuous torque controller giving seven forward speeds of 4, 8, 12, 15, 17, 20 and 25 miles per hour, re-



MOTOR, SHAFT DRIVE AND REAR AXLE.

on good country roads of 15 miles per hour, and to be suitable for country driving as well as for town use, as its mileage on one charge is given as about 130.

The car has a wheel base of 80 inches, a standard tread and 32 inch artillery wheels with Marsh quick detachable rims and 3½ inch Palmer web tires. The rear axle is a full floating type with Hess-Bright annular bearings in the hubs and New Departure ball bearings at the differential. The front axle is an I section drop forging with the steering rod in front of the axle and New Departure ball bearings on the knuckle spindles.

The standard battery equipment consists of a 24 cell, 13 plate Exide battery, but other sizes and makes are optional. A Gen-

spectively. The maximum efficiency is obtained at a speed at from 15 to 18 miles per hour. At this speed the battery discharge rate is well within the normal. The next lower speed of 12 miles per hour is said to be also a very efficient running speed and to give great mileage. The highest speed of 25 miles per hour is obtained by means of an accelerator pedal, but at this speed the drain on the battery is necessarily very heavy. The weight of the car without passengers is about 2,500 pounds.

The car is equipped with a combined voltmeter and ammeter of the D'Arsonval type, which is placed in a convenient corner above the window. A speedometer combined with odometer is also conveniently located, and helps to keep track of the charge in the battery. The car is steered by means of an inside side lever, and is said to be very easy to steer on account of its long wheel base. All of the brakes act directly on the rear wheel hubs, and in design follow closely the brakes used on gasoline cars.

The body is said to be particularly roomy. All of the movable windows slide up and down. There is an exceptionally large step, and a drop frame is employed which brings the floor of the car 10 inches above the step and the step 14 inches above the ground, thus facilitating ingress and egress. The company state that after experimenting with the two voltage control they decided to use 48 volts exclusively; that is, to keep all of the cells constantly connected in series, which permits of the use of the continuous torque controller. The fenders are covered with grain dash leather, and the upholstery is in imported broadcloth or hand buffed leather. The equipment includes side lamps, tail lamp, season odometer, trip odometer, speedometer, dome light and tools.



THE OHIO ELECTRIC COUPE.

#### The New Model Rainier Cars.

The preliminary announcement of its 1910 line has just been issued by the Rainier Motor Company. It lists four touring models to sell at \$4,500 with complete equipment, and a limousine and a landaulet at \$5,750 and \$5,850, respectively.

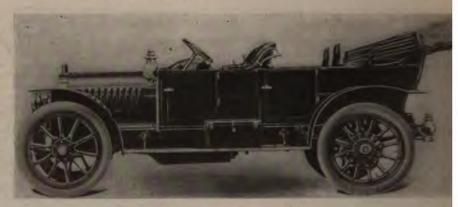
The chasses for all the models, except the baby tonneau, are identical, while the power equipment in all these models is the same—consisting of a 45-50 horse power engine of the four cylinder, four cycle type.

One of the models, the enclosed touring car, is a distinct innovation. In addition to the tonneau seat, the front seat is fully enclosed, a door opening at the left side beside the owner's seat, and there being a solid panel on the right side beside the driver. The panel is somewhat lower than the door line and the tonneau, in order to permit the easy handling of the levers; but the extra door on the left hand side is the same height as the tonneau door, making a very pleasing line from the dashboard back.

The advantage of the enclosure is obvious. It protects the occupants of the front seat from wind and weather and makes the riding there as comfortable as within the tonneau. The regular touring model is also furnished, as well as baby tonneau and close coupled car.

The Rainier car has been well known in New York for years, and 800 are said to be owned here. It has shown up prominently in various races the past season, and is to be pushed more energetically from now on in other sections of the country as well. The car is equipped with the same power as previously, has a 119 inch wheel base and exhibits no material change in the mechanical construction. It is built in three units—the power unit; the clutch, transmission and universal joint in the second unit, and the Cardan shaft and rear axle in the third unit

The motor unit is unchanged except that the oiling system has been somewhat sim-



RAINIER 1910 TOURING CAR.

plified. The motor unit is notable for its accessibility.

A change has been made in the transmission unit to secure greater accessibility and slightly better distribution of weight, the transmission and clutch being now housed in a single case with a partition to prevent oil from passing from one part to the other. The addition of a helix or screw thread to the clutch is claimed to effect a notable improvement.

The rear axle design has also been changed somewhat to obtain greater accessibility, while the brake application has been altered to secure larger braking surface and greater rigidity. The front axle design has been modified so that the steering cross rods are brought behind the front axle.

The motor is of the four cylinder, four cycle type, with 5 inch bore and 5½ inch stroke. The cylinders are cast in pairs and have large water jackets surrounding each cylinder. The valves are on opposite sides and interchangeable, and, like the manifolds, are exceptionally large. The cams are integral with the cam shaft. The cam shafts run in special bronze bearings. The crank shaft is cut from a solid bar of nickel steel. The main engine bearings and connecting rod bearings are bronze, with babbitt interlining of the inserted type. The oil reservoir is at the bottom of the crank

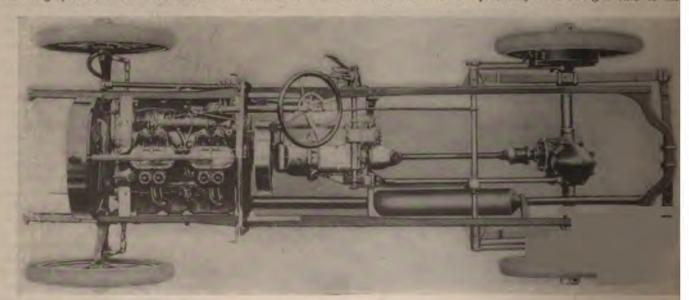
case, with a groove under each comme rod bearing. An oil pump secures cit tion, while the system of lubrication p cally eliminates all external pipes.

The water circulation is effected by a pump of the bucket type, while a fan a in cooling. The carburetor is the matic float feed type, with gravity The simplified make and break syste ignition, which has been employed in Rainier car for the past three year continued.

The clutch is a multiple disc clutch alternate steel and bronze discs, ope through a helix which causes the content to engage softly and increases its postible load on the engine increases, so slipping is impossible, it is claimed hand hole at the top of the housing mits easy adjustment or examination.

The transmission is a four speed of type, with one reverse and direct drithe third speed. Shafts and gear nickel steel. Flanges are forged integrithe shaft and gears bolted to the first Shafts run on annular ball bearings, movable cover permits the gears to billy examined, lubricated or removed, entire case is hung by a three point at sion.

The Cardan shaft transmits the practically in a straight line to the

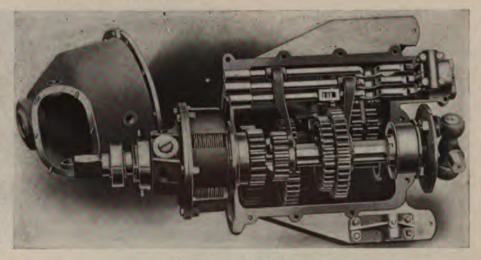


PLAN OF RAINIER CHASSIS.

he differential is the bevel gear and type. A full floating rear axle is A live axle is carried within a tubue on which the double ball wheel s are mounted, the tubular axle carne weight of the car. A double V orsion rod parallels the propelling Double ball bearings are used in the and single ball bearings in the dif-1 and propeller shaft.

ear spring suspension is of the platype, with three springs supporting ght of the body. The front spring he semi-elliptic type. This spring ion, coupled with the rational weight tion of the car, is claimed to prory easy riding qualities.

front axle is a solid drop forging of on. The front wheels are mounted ble ball bearings. The brakes are arge, one external contracting, the nternal expanding; both operate on



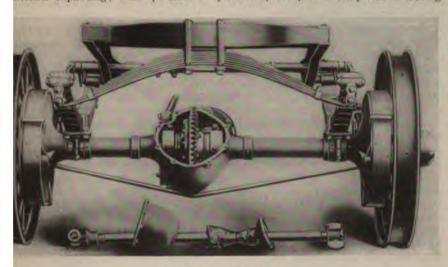
CLUTCH AND CHANGE GEAR.

The Wisconsin Carriage Company, of Janesville, Wis., have completed a touring

car model bf 115 inch wheel base, with a

40 horse power, which is to sell at \$1,750. The car was designed by T. E. Warnock.

Federal Cross Country Type Tire.



REAR CONSTRUCTION

bolted to the spokes of the rear

steering mechanism is of the worm t type. The reach rods and knuckles kel steel. The steering tie rod is behind the front axle and slightly

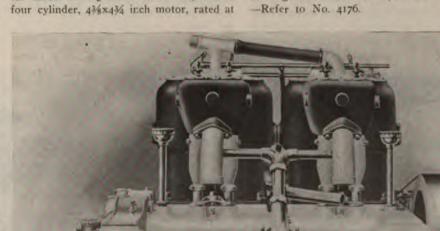
control consists of the throttle, foot ator, clutch and service brake pedals, speed and emergency brake levers, ry air control lever, muffler cut-out compression release.

wheels are 36 inches front and rear, llery type, and carry 4 inch tires in and 41/2 inch tires in the rear. The is pressed nickel steel and drops 21/2 forward of the rear axle. It has ross members. The weight of the 3.000 pounds.

Argentine Motor Club will conduct urance contest from Buenos Ayres to o and Cordoba, a distance of 650 during the month of January. Presile Archorena, of the Automobile of the Argentine Republic, offers a alued at \$200 in connection with ntest.

The Federal Rubber Company, Milwaukee, Wis., have produced an all rubber anti-skid tire, known under the above name. This is claimed to be the most heavily constructed tire on the market, and is recommended particularly for heavy limousine cars and for winter usage. A mileage of about 10,000 is claimed. The tire is considerably higher in price than any other on the market, which is due to the fact that it has a specially treated tread said to be of unusual toughness. This tread is also used on the regular smooth or plain repped tire of the company.

An American business house writes to the Bureau of Manufactures that it desires illustrated catalogs, with prices f. o. b. steamer New York, for a twenty passenger motor car for country service, and a freight car of about 40 horse power. -Refer to No. 4176.



SIDE VIEW OF RANIER ENGINE

The Simplex Chassis.

There will be few changes over the 1909 model in the Simplex chassis for 1910, made by the Simplex Automobile Company, 614 East Eighty-third street, New York city. The company's line for the coming season will comprise three models, two 50 horse power, one a toy tonneau and the other a seven passenger touring car, with 124 and 129 inch wheel base respectively. and one 90 horse power tonneau or gentleman's roadster with a wheel base of 124 inches. The cars of the company are now being sold by their own sales department, located at 1860 Broadway, New York city, instead of by the Palmer & Singer Company, as in the past.

Only the chassis is being produced. While bodies can be supplied the selection of this part is generally left to the purchaser. The chasses are produced in series, and improvements are added whenever a new series is begun, after beng thoroughly tried out on the road, instead of waiting till the end of the season.

The motors are four cylinder, four cycle, water cooled, with cylinders cast in pairs. The valves are placed on opposite sides and are actuated through roller lifters from separate cam shafts. The cylinders have a 534 inch bore and the pistons a 534 inch stroke. The outside walls of the water jackets are separated from the cylinder walls by half an inch space. The water jackets completely surround the cylinders and also the inlet and exhaust valve seats. Each pair of cylinders is secured to the crank case at the base by fourteen studs. The pistons are slightly ovaled at the top and ribbed inside, making it possible to reduce the weight without sacrificing strength. Each piston is fitted with four compression rings which have an angle joint and are pinned in place. The compression rings are all located above the piston pin and oil grooves are provided below as an aid in the distribution of lubricant. The piston pin is 11/4 inches in diameter, of chrome-nickel



SIMPLEX TOURING CAR.

steel, with a hole through the centre for supplying lubricant to the rod bearing. It is secured to the piston by means of a pressed fit and a dowel, the latter having a split end which is opened in the hollow of the piston pin.

The valves are 24½ inches in diameter at the smallest part of the 45 degree seat and 2% inches at the largest diameter, and are made of 25 point carbon steel with ½ inch stems and ½ inch lift. The cam and cam shaft are forged integral. The cams and bearing surfaces are ground to size after being hardened. The timing gears are secured to the cam shafts by means of flanges which are forged and turned integral with the cam shafts. The timing gears are of steel and mesh into the steel crank shaft pinion.

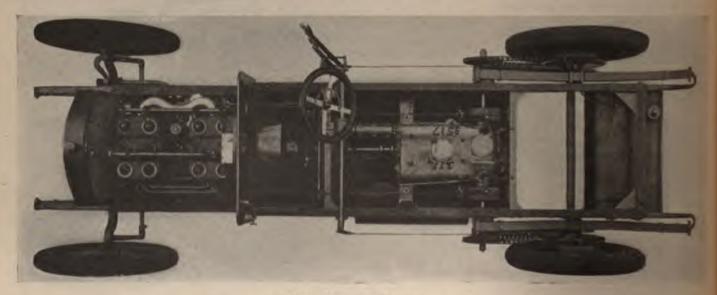
The valve lifters are fitted with adjusting screws for setting the valves. The roller and pins are hardened and provided with means for lubrication from the splash in the crank case. The lifter is fitted into a phosphor bronze guide. The connecting rods are H section drop forgings. The upper bearing is phosphor bronze, 13/4x2% inches, while the marine type lower bear-

ings are of Fahrig metal, 2 inches in dimeter and 334 inches long.

The crank shaft is drop forged from Krupp E. F. 60 point chrome-nickel stal, and has three main bearings, two plain and one annular ball bearing. Both plain bearings are of Fahrig metal, 4½ inches long and 2 inches in diameter. The ball bearing is in front. All crank shaft bearings are ground and lapped to size,

The front gears, of which there are seen, are all contained in an oiltight compariment in the front portion of the crank case. The intermediate magneto and water pump gean are mounted on ball bearings.

The crank case is of aluminum, in two sections. Pockets are provided to supply oil to the connecting rod ends when ascerding grades. The base is not sub-divided into separate oil compartments. Oil enter the base at the front. A side oil tank is carried, which is so arranged that by opening a cock at the driver's feet the crast case can be supplied with oil. There are two hand hole plates, on which are two vent tubes for relieving crank case compression. Owing to the large hore and stroke and high compression relief constroke and high compression relief constroke



PLAN VIEW OF CHASSIS.

vided with which to relieve the comn in the cylinders when cranking to ne motor.

water is circulated by a large gear centrifugal pump through a square diator, while the flywheel acts as the . The Bosch magneto is also gear and forms the current source for

multiple disc clutch, with its seventyteel and bronze discs, is entirely enand contained in the flywheel, and is with the transmission case by of a propeller shaft. The change gears, differential and jack shaft are tained in one case, and are carried on arings. The final drive is through ains.

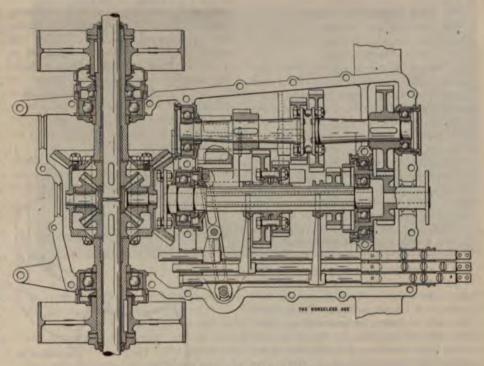
car is provided with two contracting ntial brakes, one on either side of ferential, and two internal expandnergency brakes in the rear wheel et drums. These emergency brakes t iron to steel.

transmission is a four speed selective, he control lever working in an H nt.

frame is of Krupp chrome-nickel cold pressed, with all fittings drop inswept in from to give shorter radius. Both axles are drop forged Crupp chrome-nickel steel, and are of on, 134x21/2 inches. The wheels are ed with 36x4 inch and 36x5 inch nd are carried on annular ball bear-Both front and rear springs are liptic, the front 36 inches long and s wide, the rear 54 inches long and thes wide. The steering gear is a and sector mechanism, with the spark rottle control levers located above inch steering wheel. The gasoline of tinned sheet steel, holding 28 galnd is located under the rear end of me\_

#### H. & C. Tire Inflator.

mple tire inflator utilizing the burnt from the motor cylinder is manufacby the H. & C. Tire Inflator Comof Dayton, Ohio. The spent gases principally of carbon dioxide and en and are not injurious to the rubhe gases pass through a filter which ts oil and other foreign matter from g the tire. They are delivered cool, t the tire need be inflated only to sired pressure. Any pressure up to ounds per square inch is available. lter is constructed of brass tubing, iches long by 25% inches in diameter, rass caps forming the ends. On the nd a shut-off valve is located, and other end a pressure gauge for deing the pressure in the tire, and also ock for relieving the pressure in the and blowing out any impurities that ave collected. Cast integral with the aps are brackets for fastening the to the running board or other delocation. Into one of the priming cup



TRANSMISSION OF SIMPLEX CAR.

holes of one of the motor cylinders is screwed a small pipe containing a, check valve, to which is attached a ¾ inch copper tube leading to the filter. This arrangement furnishes the pressure when the motor is being operated. The inflator can be attached to any explosion motor. The outfit consists of a special non-return valve, 6 feet of ¾ inch copper tube with unions attached, the filter with shut-off valve and gauge, 12 feet of rubber tubing with standard tire connections, and one cut-out switch for cutting out the ignition of the cylinder being used if it is desired.

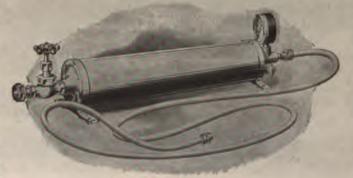
# Wisconsin Carriage Company's Cars.

A four cylinder, 40 horse power automobile has been produced by the Wisconsin Carriage Company, of Janesville, Wis., ranking among the largest manufacturers of fine vehicles in the United States. The car has been subjected to exhaustive tests, and the company are preparing for a production of 100 cars for 1910. The Wisconsin Carriage Company on October 1

completed work on a large factory building, with 75,000 feet of floor space, making its capacity more than double the previous capacity. It develops now that the new building was built for the express purpose of building automobiles, and that on October I T. E. Warnock, a well known designer, and Oliver Gleason, a factory superintendent, were engaged to work on the new car.

The car will sell at \$1,750, with optional body equipment. A close coupled and a five passenger body are offered. The wheel base is 115 inches, with 34 inch artillery type wheels, having 11/2 inch spokes and 4 inch tires. The engine is a standard four cylinder motor, water cooled, measuring 43% by 43% inches, with an A. L. A. M. rating of 405% horse power. The improved Schebler carburetor is used. The motor is equipped with a double ignition system, Bosch high tension magneto and coil and timer. The transmission is selective, with three speeds forward and reverse, running on annular bearings. The clutch is of the cone type, faced with chrome leather on springs for gradual engagement. The car

has a full floating type rear axle of pressed steel, enclosing the drive shaft in a torsion tube. The front axle is a double channel section pressed steel. Rear springs are three-quarters and front springs semi-elliptic. The car has not yet been named, and it has not been announced when deliveries begin.



H. & C. TIRE INFLATOR.

#### The New Columbia Gasoline Car.

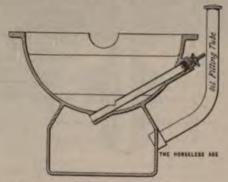
The new gasoline car of the Columbia Motor Car Company, Hartford, Conn., has already become known to the public by its participation in the Fairmount Park race and the Wheatley Hills Sweepstakes race. It is known as the Mark 48, Lot 4, and is really a continuation of a type which has been manufactured for five years. The car is provided with one of four different styles of bodies, viz., a five passenger touring body, a four passenger roadster body, a seven passenger limousine body and a seven passenger landaulet body. The company also make prices on the chassis with both touring and limousine body, and both touring and landaulet body, as well as on the chassis alone and the different styles of bodies alone.

The motor is a four cylinder vertical one with the cylinders cast in pairs. The bore is 4.5 inches and the stroke 4.7 inches, giving a rated horse power of 32.4 on the basis of the A. L. A. M. formula. The cylinder heads are, of course, integral with the cylinders, and are machined on the inside. All of the valves are located on one side of the engine and operated from a single cam shaft. The cylinders are cast in pairs, with the water jackets integral.

The cooling system comprises a cellular radiator, a flywheel fan and a positively driven centrifugal pump. The well known Columbia float feed, double jet carburetor, with two separate throttles and two automatic auxiliary air valves, is used. Both of the mixing chambers are water jacketed. The ignition equipment is somewhat of a departure from conventional practice. Two absolutely independent systems are provided. One of these consists of a Bosch low tension magneto supplying current to make and break devices and producing a contact spark. The other system comprises an Exide storage battery as the source of current, and a Seeley high frequency spark system operating on the high tension principle. The time of the spark can be varied

by means of a finger lever on the steering wheel. There is also a throttle lever on the steering wheel, by means of which the engine governor can be caused to act at any speed from 5 to 20 miles per hour. The governor controls one carburetor jet through a small butterfly valve, giving a very fine adjustment, while the pedal operated accelerator controls a separate jet through a large butterfly valve for quick acceleration and fast running.

The engine is lubricated entirely by splash, the oil level in the crank case being maintained by means of adjustable overflow



OIL LEVEL ADJUSTMENT IN COLUMBIA ENGINE,

dams. The oil is constantly circulated and replenished after having been strained, by a positively driven gear pump. All of the bearings in the engine are of bronze and babbitt lined. The muffler is of the Powell type and is claimed to give a very silent exhaust combined with slight back pressure.

A conical clutch is built into the flywheel; it is leather faced and contains a series of small aluminum shoes backed by springs, which are designed to insure gradual engagement. The change gear is of the sliding type, and affords three forward speeds and one reverse. The highest forward speed is a direct drive. The shafts and gears are all of chrome-nickel steel, and the bearings are

Hess-Bright ball. The drive to the floring rear axle is by a shaft and bevel gear. The universal joints of the propeller shaft on completely enclosed within grease retaining covers. The rear axle is mounted in Token "short series" roller bearings, which are also used in the front wheels. The fine axle is an I section drop forging made complete with steering knuckles and spring seats in one piece without welds.

The frame, which is pressed from carbo steel, is narrowed in front, and is supposed on semi-elliptic springs in front and real made of a large number of thin leave of alloy steel. The car has a wheel base of 115 inches and the regular standard 56 into tread. The road clearance is 11 inches. The road wheels are of the wood artillery patern with forged steel hubs and Hartford universal quick detachable rims. The the equipment of the open cars is 34x4 inche all around, and on the closed cars 344 inches in front and 34x4½ inches in the rear, all tires being Hartford quick detachable clinchers.

Color options are given between gress and red for the touring car; green, red ml gray for the roadster, and green, blur and maroon for the closed cars. The open an are upholstered in hand buffed black leather, and the closed cars in green, blue or maroon leather or broadcloth. The equipment of all cars includes two acetylene hadlights, two oil side lights, an oil tail light an acetylene generator, horn, muffler ouout, trunk rack, tire carriers, tool box, as tra luggage box and a complete set of tools The touring car and roadster are fitted with a robe rail and foot rest, while the closed cars are provided with electric annunciator, dome light, toilet case, watch, mirror, scet bottles and cigar lighter. Ample rain boots are also furnished with each car.

A photograph of the roadster is shown herewith, and a cut of the touring car will appear in our Madison Square Garden Shw Number.



COLUMBIA MARK 48 ROADSTER,

Velie, 1910.

The Velie "40," manufactured by the Velie Motor Vehicle Company, of Moline, Ill., is an entirely new product, embodying some of the best features of the former "30." This model will be furnished in several different styles, including a five passenger touring car, a roadster, with the option of rear seat equipment, and a toy tonneau. The standard finish will be Velie blue, but an option is given on primrose cream wheels and Velie red throughout. The car, equipped with two gas head lights, two side oil lamps, one oil tail lamp, gas, generator, storage battery, tool kit and tire repair outfit, sells for \$1,800.

The motor is a four cylinder, four cycle, water cooled one of 41/2 inch bore and 51/4 inch stroke. The cylinders are cast in pairs and are offset three-eighths of an inch from the centre of the crank shaft. The valves, which are 2 inches in diameter, are all on the left side and operated by a single cam shaft, while on the right side are located the gear driven centrifugal pump and magneto, which latter is also driven by the pump shaft. The water jackets are very spacious, the water being discharged through a forked brass pipe into the jackets at the bottom on the left side, with the outlet from the top midway between the cylinders in each pair. This arrangement takes the water from the hottest portion of the cylinders and keeps the water flowing to this point.

The valves are drop forged from nickel steel, with the lower ends of the stems hardened, while both stems and seats are ground accurately to size. The valves are operated by roller lifters, which are equipped with screws for adjustment. The connecting rods are drop forged from high carbon steel, with phosphor-bronze bearings at the top and white bronze lower bearings. The crank shaft is drop forged from high carbon steel, heat treated, and is finished all over; it has three main journals running in white bronze bushings. The solid web cast iron flywheel, in which the three dry plate clutch operates, is fitted to



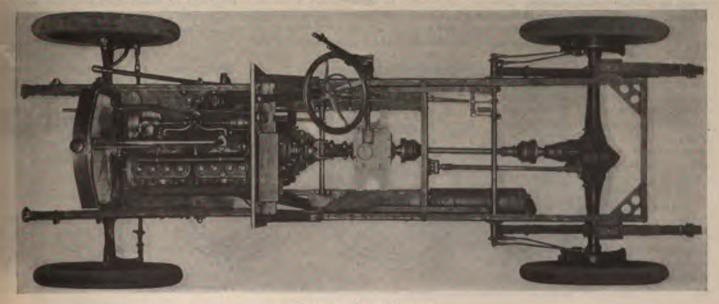
VELIE 1910 TOURING CAR.

the crank shaft by means of a taper bearing, key and lock nuts.

The cam shaft is of high carbon steel with cams forged integral, and is carried on annular ball bearings. The pump, magneto and commutator shafts are also carried on annular ball bearings. The pistons are fitted with three compression rings above the piston pin and oil grooves to aid the distribution of oil below the pin. The ball bearing fan is flat belt driven and supported by a bracket secured to the forward end of the crank case. In the upper portion of the fan bracket is fitted an eccentric into which the fan stud is screwed, providing adjustment for the fan belt. The circulation of the cooling water is effected through a centrifugal pump of large dimension, a six blade fan and a square tube radiator.

The crank case is of aluminum alloy, in two main parts, with a gear compartment cover in front and a bearing cover at the rear. The case is not parted at the bearing centre line, as is the general practice, but the upper portion forms a barrel in which is located the crank shaft and its bearings. The lower portion is simply the oil reservoir, from which the oil is drawn by means of a gear pump driven from the lower end of the commutator shaft. The oil is pumped from the reservoir through a sight feed located on the dash, so the driver can tell at a glance whether the oil is flowing to the crank case bearings. Pockets are provided into which the connecting rods dip, and are so constructed that a constant level of oil is maintained.

The ignition differs considerably from the general system employed, there being three separate and distinct systems, two of which work through one set of plugs and one through another. The low tension magneto and storage battery work through a synchronized coil on the dash, and through the magneto distributor; this makes two systems, as ordinarily embodied in dual equipments, while the storage battery, working through four unit coils, and the commutator form the third system of ignition. Every motor is provided with a foot accelerator and muffler cut-out, which are located between the clutch and brake pedals, and pressure of the foot on these small pedals opens the throttle and muffler cutout simultaneously, or they can be operated



PLAN OF VELIE CHASSIS.



VELIE REAR CONSTRUCTION SHOWING ACCESSIBILITY OF DIFFERENTIAL

independently. A crank case compression relief and oil filler is located on the left front motor hanger arm.

The clutch is, as above stated, of the three dry type, with a slip square between it and the transmission, and a brake that works in unison with the pedal and stops the shaft from spinning, thus permitting the gears to be changed quietly. The slip square gives a universal action between the clutch and transmission, preventing the binding of transmission gears over rough and uneven roads.

The transmission is of the selective three speed type, with both shafts carried on Timken short series roller bearings. The gears are 3½ per cent, nickel steel, hardened and ground.

The propeller shaft between the transmission and rear axle is provided with two double universal joints of the cross and roller type, the transmission and drive pinion shaft ends being squared.

The rear axle is a Timken full floating type, with the differential casing and wheels carried on Timken toller bearings. The front axle is a drop forged I section Timken axle, with steering arms located behind and above the axle. The brakes work through equalizers on the rear wheel drums, and are internal expanding and external contracting, respectively, and operated in the usual manner. The front springs are semielliptic, 2 inches wide and 38 inches long; the rear springs are three-quarter scroll elliptic, 2 inches wide and 46 inches long. The wheel base is 115 inches, and a 34x4 inch quick detachanble tire equipment is furnished.

#### Milwaukee Tool Grinder.

These tools have an iron case very accurately machined, and when assembled are oil tight, which protects the gears and bearings from the fine dust from the emery wheel and holds the oil, keeping the bearings lubricated and reducing the wear to a minimum. The driven shaft that also carries the grinding wheel is supported at both sides of the driven pinion by liberal bearings. The driving gear is also supplied with two bearings, one on either side on



the crank shaft. At the lower part of the case are two projecting prongs which rest on a cable or bench, and below this is a thumb screw which sets up against the bottom and permits of quickly fastening or removing the grinder from any bench or

table. The gears are all accurately machined and mesh perfectly, thus causing them to run quietly and smoothly with very little friction. The ratio of the gears permits of very high speed of the grinding wheel, with low speed of the crank. The universal tool rest is claimed to be strong and simple, and can be set on either side of the wheel and adjusted to any angle or position desired. These grinders are made by the Garage Equipment Manufacturing Company, of Milwaukee, Wis.

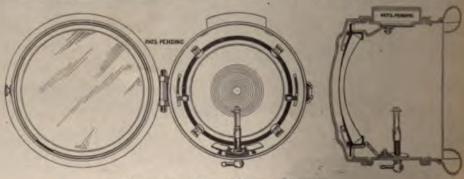
#### Manhattan Swell Front Headlight.

We illustrate herewith the new swill front design of double metal headlight made by the Manhattan Screw and Stamping Works, West End avenue and Sixtyseventh street, New York city, for 1910 The lamp consists of two full shells, each supporting the other, and is claimed to be twice as strong as a single shell lamp. By rolling in the swell front to a smaller diamcter than the body, the side shadows and side glare are said to be cut out. Great pains have been taken in the design to insure a clean lamp. The expanding collar permits of the use of a solid front glass The flat flame burner is claimed to be inpossible to choke, and it is also claimed that it will not crack the glass or the mirror. All bolt heads, screw heads and couplings are on the inner body, and the outside is therefore smooth and clean.

#### Personnel of Owen Motor Car Company.

The Owen Motor Car Company, which, as announced in a recent issue of The Horseless Age, has been organized in Detroit by Ralph Owen and the Smith Brothers, who were formerly connected with the Olds Motor Works, of Lansing, Mich., will turn out a 52 horse power, long stroke car, to sell at \$3,200. The officers of the company are Edward Turnbull president, Angus Smith treasurer, and Ralph Owen general manager. The company have bought a nine acre plot on the boulevard on which there is a four story fox750 foot factory building. It is planted to turn out 500 cars next year.

The space in the lobby of the Hotel Breslin, New York, will this year be occupied by a Premier during the Palace Show, and a Chalmers during the Garden Show.



MANHATTAN SWELL FRONT HEADLIGHT.

### THE FIELD OF COMMERCIAL APPLICATIONS.

o-operative Delivery Service. umber of merchants in Sioux City, Ia., formed a partnership for the purpose nducting a co-operative delivery ser-By giving an order for the total er of vehicles required for the serhey expect to save on first cost, and nducting a centrally located co-operaarage to greatly reduce the cost of care aintenance. The garage expenses will irged on a pro rata basis against each e, and all supplies will be furnished mbers at cost. A competent mechanic e engaged to act as superintendent of rage, and will be held responsible for ndition of all vehicles intrusted to his The trucks will be carefully inspected night, the tanks filled, batteries tested he vehicle turned over to the driver morning in first class condition. The ntendent will instruct the drivers in peration and care of the vehicles. One o reserve vehicles will be kept on and in case one of the trucks breaks on the road the driver will telephone garage, and one of the reserve vehiwill be sent out immediately to take load and complete the trip.

e association plans to purchase about en heavy trucks and two light delivery as within the next ninety days. All e prominent makers of motor trucks elivery wagons will be asked for demtions of their vehicles. The members at first to be limited to twenty-five and the first meeting is to be held week.

#### g Distance Motor Trucking.

Van Sciver, of Camden, N. J., opertruck daily between Camden and At-City, a distance of 60 miles, and states e can handle the merchandise to be red in Atlantic City quicker than he train, with less handling and at oneless expense. It avoids expensive ng of his goods and carries them difrom his factory to the customer. before it was necessary to carry them railroad station, send them by freight, artage at the other end. We are ind that the trucks make the 120 mile rom Camden to Atlantic City and reeach day, carrying a load in both dins. The trucks used are 31/2 ton Re-

#### ial Car for Harriman Branch Roads.

accompanying illustration shows a l car ordered by E. H. Harriman beis death, which is to be used on a prioad running from a point on the Erie oad to the Harriman private residence. car is a Lambert friction drive, and was ordered for the purpose of ascertaining whether a gasoline car for from twelve to fifteen passengers could be utilized more economically than steam cars on branch roads on the Harriman lines. As shown by the illustration, the car is especially constructed throughout, and is unique in that it is the first car ever manufactured for a similar purpose.

#### Commercial Notes.

Automobiles are to be placed in service in Dayton, Ohio, for collecting the mail at the various stations and factories during the day, so as to have it ready for shipment before the evening rush sets in. A motorcycle is now being used by the department for delivering special delivery letters, and another will probably be added shortly.

W. D. Foil Company, liverymen of Mount Pleasant, N. C., have organized an automobile company for the purpose of operating an automobile line between that place and Concord. They propose to put in operation a five passenger, 40 horse power machine, and to make two trips to Concord daily, one of which will carry the mail. Side trips to other towns will also be made for the convenience of special parties.

The Minnesota State A. A. held a meeting at the Plaza Hotel in Minneapolis last week, at which it was decided that the fiscal year shall hereafter end in January instead of in April. The annual meeting of the association will be held in St. Paul about January 15. The railroad fares of the official delegates will be paid out of the association's treasury hereafter, which is expected to insure a larger attendance. Owing to the increase in membership it is likely that an office of second vice president, and perhaps also third vice president, will be created at the meeting.

The motor patrol wagon of the Omaha (Neb.) police department was destroyed by fire on November 19, and a request for an allowance of \$10,000 to make good the

loss has been made by the police department to the city council, but action on the request has been deferred. The motor patrol caught fire while its driver was working underneath it when the drain plug or cock of the gasoline tank accidentally dropped out and the spilled gasoline was ignited by an alcohol burner.

Gasoline motor car service has been established between Dayton and Wallula, via Walla Walla, Wash. The service has been urged by commercial organizations along the route for several years.

The board of public safety, Indianapolis, is in the market for a 1½ ton truck to be used by the electrical force of the police department, and to cost not more than \$1,500. A similar vehicle is used by the electrical force of the fire department.

#### Chicago Taxi Drivers Organize.

The Auto Drivers' Protective Association has been organized at Chicago, and opened headquarters at 134 Washington street. The membership is comprised mainly of taxicab drivers, and the object of the association is to furnish free legal advice in case of arrest of members for speeding. The initiation fee is \$2 and the monthly dues are 50 cents. The officers are: Walter W. Wilcox, president; Taylor S. Snow and Frederick McH. Kitching, vice presidents; Neil Gronberg, secretary; Roy O. Gilbert, treasurer; Edward M. Seymour, counsel and John Flood, medical director.

#### Ohio Road Construction Estimate.

State Highway Commissioner J. C. Wonders, of Ohio, has filed with the Auditor of State estimates for the needs of the department for road improvement for 1910. He asks for \$880,000, or \$10,000 for each of the eighty-eight counties of the State. He also asks for additional money for the employment of engineers. Last year the appropriation for road improvement was \$5,000 per county.



LAMBERT FRICTION DRIVEN CAR MOUNTED ON RAILWAY TRUCK,

#### Edgewater-Fort Lee Hill Climb.

Owing to congested traffic and inability to control the crowds, the Fort Lee hill climb, run under the auspices of the Edgewater-Fort Lee Automobile Association last Saturday, was called off by Referee Whiting after only eight of the fourteen events had been run. The course is very irregular, with a sharp bend before the finish line. but the track had been put in excellent condition, and very fast time would have been made but for the crowds and the total lack of consideration on the part of many automobile owners and drivers, as well as drivers of horse vehicles. These people asserted their right to continue on their way, and refused to be detained even during a contest, and the police were powerless. This headstrong action was entirely inexcusable, as there was another route around the hill course which was only a couple of blocks out of the way. Then the spectators showed great lack of judgment by flocking onto the track, completely filling it for nearly its full length, and it is a wonder that no one was injured. As it was, Klebes on a Reading-Standard motorcycle, in trying to avoid a collision, ran into a ditch and was thrown, but escaped bodily injury, though the front wheel of his machine was demolished. Tom Kincaid in a National made the quickest ascent in the classes for cars, in 56.57 seconds, while Chapple on an Indian motorcycle made the 3,000 feet in 50.15 seconds. In the Class A event, for commercial motor vehicles, a Buick delivery wagon climbed the grade in 2:34.48.

After the contest had been declared off many of the drivers of the large, powerful cars which had been waiting to compete in their several classes drove up the hill in a reckless manner, and it is a wonder that someone was not seriously injured.

At a meeting of the promoters held immediately after the events were called off, it was decided to run off the remaining events some day during the following week, as some thirty odd cars, many-of them high powered, were unable to compete at all.

#### SUMMARIES.

CLASS	A,	DELIVERY	WAGONS	UP	TO	ONE	TON
		C	APACITY.				

E. H. Taylor, Buick, 20 h. p....... 2:34 E. Walter, Æolian, 24 h. p...... 2:56

CLASS B, TRUCKS UP TO TWO TONS !	NET.
A. Defrietas, American, 55 h. p	5:15
H. Greene, Couple Gear, 40 h. p	
H. Church, Couple Gear, 40 h. p	
The second secon	
GASOLINE STOCK CARS, \$850 OR LES	15.
J. J. Berthoff, Ford, 20 h. p	1:07.15
F. F. Cameron, Cameron, 24 h. p	1:14.64
E. C. Walker, Empire, 20 h. p	1:46.60
THE RESERVE OF THE PARTY OF THE	
GASOLINE STOCK CARS, \$851 TO \$1,2	50.
F. F. Cameron, Cameron, 24 h. p	1:07.20
C. E. Easter, Buick, 18 h. p	1:13.31
G. Ainslie, Hudson, 20 h. p	1:16.20
A. E. Bloom, Cartercar, 22 h. p	1:17.02
R. W. Fulcher, Hudson, 20 h. p	1:18.11
T. C. Wolverton, Maxwell, 22 h. p	1:31.20
at or morrenout maxwell, as the printer	1.31.20

#### THE HORSELESS AGE

GASOLINE STOCK CARS, \$1,251 TO \$2,	000.
A. Warren, Buick, 30 h. p	1:02.70
L. Warren, Selden, 36 h. p	1:10.30
McIntire, Pullman, 30 h. p	1:11.43
F. Cimmiotti, Pullman, 30 h. p	1:16.70
J. J. Meyer, Auburn, 35 h. p	1:22.40
H. C. Boyce, Petrol, 30 h. p	1:27.60

# SPECIAL CLASS FOR GASOLINE STOCK CHASSIS—300 CUBIC INCH PISTON DISPLACEMENT OF LESS. F. Strobel, Lancia, 20 h. p............. 1:06.01

F. Strobet, Lancia, 20 h. p	TYDOLAT
M. M. Hilliards, Lancia, 20 h. p	1:11.53
C. H. Tangeman, Lancia, 20 h. p	1:15.71
H. Fosdick, Lancia, 20 h. p	1:20.12
Stuart Otto, Nagant, 24 h. p	1:29.48

STOCK CARS, \$2,001 TO \$3,000.	
T. Kincaid, National, 40 h. p	0:56.57
F. Hurmance, National, 40 h. p	1:08.97
R. Carter, Selden, 36 h. p	1:12,10
J. E. Blakeslee, Pope-Hartford, 40 h. p.	1:13.27
J. H. Johnson, Grout, 40 h. p	1:20.22
J. Westervelt, Knox, 38 h. p	1:26.90
W Water Water we ben	****

#### MOTORCYCLE EVENT.

Chapple, Indian	0:50.15
R. Seymour, Reading Standard	0:51.80
Robinson, Indian	0:55.17

# Publication of Contest Rules Deferred.

The contest board of the A. A. A. held a meeting in New York on Monday at which the contest rules for 1910 were discussed. Mr. Butler, chairman of the board, states that the rules will probably not be published before the first of the year, owing to the fact that no agreement has yet been reached on several points.

#### Metzger Company May Secure Selden License.

The Metzger Motor Car Company, of Detroit, are negotiating for the purchase of the business of the Hewitt Motor Company, of New York, including the Selden license of the firm. The deal will probably be decided one way or the other this week. In the latest edition of the "Handbook of Gasoline Automobiles" the P. & S. (Palmer & Singer) car is listed under the Hewitt license and the White under the Waltham license.

#### Indianapolis Meet, December 17-18.

A race meet will be held on the Indianapolis Motor Speedway, at Indianapolis, on December 17 and 18, at which time attempts will be made to lower the records established recently at the Atlanta Speedway. This will be the first meet over the course since the construction of the brick pavement. The track, it is believed, will be completed some time this week. A few days will be required to let the pavement "set," after which drivers who are to compete will be given an ample opportunity to practice before the meet.

There have been a number of changes in addition to the repaving since the meet last August, which resulted in several persons being killed. As an element of safety, a concrete wall, three feet high and twelve inches thick, has been built around the course. New grand stands have also been erected and the old ones enlarged, so that the seating capacity has been largely increased. Ernest A. Moross, director of contests, is now arranging the program, the A. A. A. having granted its sanction for the meet. Efforts will be made to lower practically all records held by the Atlanta and Brooklands courses.

The speed trials will include distances of one-fourth, one-half and one mile and also one kilometer. Others will be from two miles to 1,000 miles, drivers to be changed frequently in the latter. There will be races for all of the classes under the A. A. A. rules and also a number of free-for-all events. Among those who will participate are Walter Christie, driving his Christie car; Louis Strang, driving a 200 horse power Fiat; Barney Oldfield, driving a Benz, and possibly a Knox; Ray Harroun, driving a Marmon "32," and John Aitken. driving a National "40." The management expects about thirty well known drivers to compete. During the 1910 season it is understood six meets are to be held on the course, including two for aeroplants and dirigible balloons.



ONE OF THE TURNS ON THE FORT LEE HILL.

Mile High Climb at Redlands, Cal.

Thirteen cars competed for first honors in the Thanksgiving hill climb held at Redlands, in southern California, and to the unlucky number of the starters some of the drivers ascribe the ditching of four of the entries on the tortuous grades and dangerous dips of the course. The contest was unique in many respects. The cars started among the tropical orange groves of the valley, shot between rows of magnolias. pepper trees and palms at top speed, and finished in a driving snow storm almost 6,000 feet above the starting point, after having traversed a course 15.1 miles long, rising from level stretches at the start to grades exceeding 20 per cent, at the finish, abounding in sharp turns and sudden dips after steep hills. The length of the course and continual rise of the road over a distance of more than 12 miles gave the results real interest, since the usual hill climb of a mile or two is insufficient to test the endurance of modern motor cars.

Despite the snow on the heights, and the slight drizzle and fog in the valley, last year's records were lowered by more than one contestant. The Apperson Jackrabbit, driven by Hanshue, made the fastest time of the day in the free for all, covering the distance in 22m. 71/2s., almost two minutes better time than the Stoddard-Dayton, holder of last year's record. The Apperson's fast time was made despite the fact that the car in a previous race had lost a wheel on a dangerous turn, and had been fitted hastily with a wheel from another car. A Maxwell, driven by C. B. Smith, almost approached the Apperson's time in the free for all, finishing in 22m. 35s.

Though the mishaps were numerous, only one man, James Gordon, the driver of a motorcycle, came to grief. His machine skidded on a curve soon after the start, hurled him to the pavement and broke his leg.

The American Simplex, driven by H. Erickson, with G. G. Corey as mechanic, became the victim of the most serious accident. At Casa Blanca, 3 miles from the finish, the road rises sharply, dips down a steep hill and at the same time describes a curve. While descending the hill at high speed the rear wheels of the Simplex skidded on the turn, the car swung around and turned over. Herrick was caught under the machine by his overcoat, but managed to slip out and assist the mechanic, who had been thrown clear of the machine, in putting out the fire originating close to the leaking gasoline tank.

The Corbin, driven by A. Livingstone, came to grief shortly after passing the same place. A steering knuckle broke and the anageable car headed into a bank of earth, throwing out both driver and chanic, though the machine did not turn

The Buick also skidded at the Casa Blanca turn and dip, the rear wheel striking the bank. Several bolts in the wheels were sprung, but nevertheless the driver finished the race and won in his class, though the damage prevented the participation of the car in the free for all.

Both in number of entries, in the size of the crowd that viewed the races along the course, and in the speed made, despite disadvantageous weather conditions, the contest exceeded last year's races. Redlands automobile dealers and owners have formed the Mile High Hill Climbing Association, which managed this year's event, and will try to arouse an even more extended interest for next year's contest.

The results of the various races were as follows:

For motor cars with piston displacement c\_ 231 to 300 inches—First, Maxwell; C. B. Smith, driver; time, 22m. 46s. Second, Pullman; Geo. Kurran, driver; time, 25m. 36s. Third, Cadillac; Walter McKeague, driver; time, 27m. 38s.

For motor cars with piston displacement from

For motor cars with piston displacement from 301 to 450 inches—First, Buick; L. N. Kerla,

driver; 24m. 55s.

For cars with piston displacement from 451 to 600 cubic inches—First, Matheson; A, Renton, driver; time, 24m. 35s.

Special match race—First, Regal; Anthony, driver; time, 31m. 11s. Second, Ford; R. Stearns, driver; time, 38m. 35s.

Free-for-all—First, Apperson; H. Hanshue, driver; time, 22m. 7½s. Second, Maxwell; Smith, driver; time, 22m. 35s. Third, Palmer-Singer; F. Seifert, driver; time, 22m. 55½s. Fourth, Chadwick; H. C. Kennedy, driver; time, 23m. 3½s. Fifth, Matheson; A. Renton, driver; time, 24m. 33s.

Motorcycles, free-for-all, from start to Casa Blanca, 10½ miles—Indian, E. Knappe riding, first; time, 15m. 49s. Second, Thor, T. Mulvihill riding; time, 16m. 27s.

Single cylinder motorcycles, same distance— First, Harley-Davidson, C. H. Clemon riding; time, 16m. 36s. Second, Harley-Davidson, R. Langford riding; time, 17m. 30s.

#### Stevens-Duryea Private Testing Track.

The Stevens-Duryea Company will construct a private testing track on a tract of land a little more than 2 miles from the Hotel Imperial, Chicopee Falls. The track will be 30 feet in width and will be paved with brick set on edge. The total cost of the track, which is expected to be ready for use next May, will be between \$30,000 and \$35,000. The importance of a private testing track is being recognized by all of the larger makers, as it avoids frequent complaints regarding speeding of testers on the public roads and also the ocasional accidents to pedestrians which are usually very costly to the manufacturers, as well as extremely annoying.

#### New Members of Accessories Manufacturers' Association.

The Motor and Accessories Manufacturers, at a meeting held in New York city on November 27, elected the following additional members: Auto Parts Manufacturing Company, Batavia Rubber Company, Driggs-Seabury Ordnance Corporation, Excelsior Motor and Manufacturing Company, Havoline Oil Company, Royal Equipment Company, the Seamless Rubber Company, Warner Manufacturing Company and Thermoid Rubber Company.

Metzger's Novel Sales Organization.

Automobile men from the Eastern and Western extremes of the country gathered in Detroit, on Nevember 29, to take part in the final organization of the selling department of the Metzger Motor Car Company. The United States has been divided into fifteen sections, and the representative in each is a stockholder in the parent company, something new in the industry. Every feature of the work and the prospects were carefully gone over by men who are among the best known in the trade. The morning session was at the factory and the afternoon was spent "at school" in the Pontchartrain. A dinner at Swan's followed. In addition to B. F. Everitt, William E. Metzger and William Kelly, of this city, those in attendance at the business meetings were: N. H. Parker. Indianapolis; W. Wayne Davis and M. B. Fletcher, Philadelphia; William Coon and F. B. Packwood, Lincoln, Neb.; A. R. Kilburn and F. S. Day, Kansas City; Walter and H. A. Githens, Chicago; H. J. Koehler and W. H. Whitt, New York; C. Arthur Benjamin, Syracuse; J. W. Bowman, Boston; W. M. Johnston, Denver; H. O. Harrison, San Francisco; John A. Sibley and W. J. Casterton, Detroit. The plan of or-ganization will be a novel one on the cooperative plan. Each dealer present subscribed to from \$5,000 to \$25,000 worth of stock, the subscriptions aggregating \$125,-000, and purchased from 100 to 500 cars, taking the entire factory output of 2,500. They will act as factory representatives in their respective districts.

## To Manufacture Runabouts in Akron, Ohio.

A corporation is being organized to locate a factory in Akron, Ohio, for the manufacture of runabouts. O. V. Dibble, president of the Buckeye Match Company, of Wadsworth, will be president and general manager, and C. R. Forth, a graduate of the Massachusetts Technical Institute, will be superintendent. Mr. Forth was consulting engineer with the Overland Company last year. S. E. Leonard, a traveling salesman, of Greenwich, Ohio, will be sales manager. It is the intention to manufacture 500 cars the first year and employ 175 men. A plant in Akron will be leased.

Alden Sampson, 2d, Dead.

Alden Sampson, 2d, manufacturer of automobiles, died of pneumonia at his country place in Pittsfield, Mass., on December 3. He was thirty-one years old, and a son of the late E. Pope Sampson, of New York. He was born in New York and educated there. In 1902 he began the manufacture of automobiles in Pittsfield, where he built a large plant. At first touring cars were built, but later attention was confined to commercial vehicles, and a gasoline motor truck was the latest product of the factory. He is survived by his widow and one son, Alden Sampson, 3d, and his mother, Mrs. Florence Sampson, of New York.

### AUTOMOBILE LAW AND LEGAL EVENTS.

#### Recent Decisions.

BACKING WITHOUT WARNING NEGLIGENCE.

To reverse a standing automobile, without warning, colliding with a pedestrian waiting at a crossing for an approaching car, was held negligence, and a master was held liable for acts of his employee in the scope of his business, though done without his knowledge. Personal examination of an injured plaintiff may be required, but failure to order was held harmless where the evidence was clear as to the extent of the injury.—Shamp v. Lambert, Mo., 121 S. W.. 770.

#### CONFUSION OF BEGINNER.

A beginner who became "rattled" was held guilty of negligence when he could have stopped the automobile and avoided injuring a pedestrian, although she was also "rattled," as her act was involuntary, caused by terror. Three thousand two hundred and fifty dollars for fracturing thigh of an old lady is not an excessive verdict.—Navailles v. Dielman, La., 50 So., 449.

### SPEEDING AND FRIGHTENING HORSES CAUSE FOR ACTION.

Driving a car in a city 25 miles an hour, contrary to ordinance, and frightening a team by such speed, and causing it to run into plaintiff's wagon, injuring him, was actionable.—Grant v. Armstrong, Wash, 104 Pac., 632.

#### SPEEDING AT CROSSINGS.

The driver of an automobile approaching a crossing in a city at a fast speed without warning, and injuring a nine year old child, was held guilty of negligence. Such a child was held not required to use the same care as an adult.—Gross v. Foster, App. Div., 118 N. Y. Supp., 889.

#### MEASURE OF SIGHTSEEING PROFIT.

In an action for breach of contract in failing to operate a "sightseeing car" and to divide profits, the measure of damages. "that 170 trips could have been made at so much profit for each trip" was held erroneous, as that was based on the assumption of good weather and full loads every trip.—Zabinsko v. Garage, App. Div., 118 N. Y. Supp., 959.

#### Gas Tank Litigation.

The Auto Lux Manufacturing Company, of Milwaukee, Wis., and P. C. Avery and George E. Burnham, proprietors, have been made defendants in a suit brought by the Prest-O-Lite Company and Commercial Acetylene Company, of Indianapolis, alleging infringement of patents. A temporary injunction has been granted the plaintiffs by the Federal court at Milwaukee. The suit is partly the outgrowth of the fatal explosion which wrecked the plant of the Gas Tank Recharge Company, of Milwaukee, on November 29, killing George L. Odenbrett,

a well known automobile agent. It appears that the Auto Lux Company sold the gas tank concern a generator which is held to be an infringement on patent rights held by the plaintiffs. Among the exhibits is a bill for two cans of carbide from the Auto Lux concern to the Gas Tank Recharge Company, the bill having been found in the ruins.

More than a year ago the Prest-O-Lite Company brought suit against the Avery Portable Lighting Company for infringement of patent. The Milwaukee company produced a small gas tank for automobiles. The Federal court decided in favor of the Indianapolis company and the Avery concern went out of business. P. C. Avery shortly afterward formed the Auto Lux Manufacturing Company.

# Severe Punishment to Break Up Joy Riding.

In an attempt to break up joy riding, Judge Whallon, of the Indianapolis Police Court, has just assessed the heaviest penalty for such an offense in the history of the city. The defendant was Harry Hackelman, driver for a banker, who took his employer's machine on Thanksgiving night, winding up early the following morning by colliding with a cab and slightly injuring two people. Hackelman was intoxicated and the police judge fined him as follows: For operating an automobile while intoxicated, \$1 and costs and sixty days' imprisonment; profanity \$1 and costs; malicious trespass, based on damage done the automobile which was used without permission, \$200 and costs and sixty days' imprisonment; malicious trespass, based on damage to cab, \$200 and costs and sixty days' imprisonment; and violating speed law, \$50 and costs.

#### Further Protests Against French Fuel Tax Proposal.

A delegation of the French Automobile Manufacturers' Association (Chambre Syndicale) has made a formal protest against the projected increase in the duty on gasoline and benzol to the Minister of Public Works, the Minister of Commerce and the Budget Committee of the Chamber of Deputies. Marquis De Dion, with the aid of statistics, proved that the automobile movement even now paid something like 50,000,-000 francs annually into the treasury of the republic, and that any additional burden would hamper its development and be a menace to the industry. His explanations are said to have produced a very profound impression, and the ministers and the committee assured the delegation that they would once more go over the tax proposals of the Government.

# Licensed Association Advertising Men Organize.

Fourteen representatives of advertising departments of licensed automobile manufacturers met at the headquarters of the A. L. A. M. in New York on Tuesday with the object of forming a permanent organization. It was agreed at the very outse that nothing should be done to restrict the initiative and the freedom of action of any of the members. It was the sentiment of those present that much help might be derived and some saving of money effected for the companies by the interchange of ideas and experiences on how to prevent any part of the advertising appropriation being diverted from its proper channel. A committee composed of Arthur N. Jervis, Chas. W. Mears and K. P. Drysdale was appointed on permanent organization. R H. Johnston and C. A. Stein were elected temporary chairman and secretary respectively. The following advertising managers were present: Arthur N. Jervis, Alco; K. P. Drysdale, Cadillac; H. W. Ford, Chalmers; Guy Hutchinson, Corbin; B. Rockwell, Maxwell; H. L. Foote, Peerless: Gen. M. Davis, Pierce-Arrow; H. A. Linehard, Pope; C. William Wurster, Stearns; C. A. Stein, Stevens-Duryea; E. Le Roy Pelletier, Studebaker; F. L. Faurote, Thomas; R. H. Johnston, Waltham-White, and Chas. W. Mears, Winton.

#### Cadillac Wins Oklahoma Race.

Norman Smith, driving a Cadillac car, won the Oklahoma-El Reno race, held on Saturday, November 27, and came into possession of the cup offered by the Oklahoma A. A. The race was full of thrilling incidents, due largely to the roughness of the roads. The distance is 67 miles, and this was covered by Smith in 1:53.13. A Franklin, driven by Ray Colcord, finished second in 1:57, and an Oldsmobile, driven by Baird, finished third in 2:02.

A Ford car, driven by Fred Winkle, turned turtle 10 miles out of Oklahoma City, and pinned Winkle beneath it, but he miraculously escaped with slight injuries. The Velie car, driven by A. Donovan, ran into a ditch some 6 miles from El Reno, but Donovan was uninjured, except for a few scratches. There were eight starters as follows: Mosely (Knox), Baird (Oldsmobile), Colcord (Franklin), Maxwell (White steamer), Smith (Cadillac), Dixon (Sellers), Burroughs (White steamer), and Winkle (Ford).

The police of Toledo, Ohio, have inaugurated a crusade against speeders, and six drivers were arrested by two motorcycle policemen on November 27.

### GARAGE AND SALESROOM.

# Buffalo Dealers and Club Unite for Show.

The Buffalo Automobile Trade Association and the Buffalo A. C., which planned to hold a show each next spring, have reached an agreement and decided to hold only a single show under their joint auspices in the old Broadway Arsenal during the second week in February. A committee of the Trade Association, consisting of G. H. Poppenberg and Charles Monroe, and another committee of the club, consisting of Harry T. Vars and Laurens Enos, will meet shortly to complete the details.

#### Wichita (Kan.) Dealers' Show This Week.

The dealers of Wichita, Kan., following the example of their Kansas City, Mo., confrères, have agreed to disagree on the show question, and four of them will exhibit at their own salesrooms during the present week, and the rest at the new building on Haymarket square. The secessionists were displeased at a decision of the management to use the Haymarket building instead of the vacant site opposite the post office, which necessarily entailed more expense, and was also less convenient for most of them.

#### Dealers' Association Notes.

The Hartford Automobile Dealers' Association will hold their third annual show in Foot Guard Hall during the week of February 14. The show committee consists of Fred W. Dart, Ed. G. Biddle and Wm. L. Ledger.

The dealers of Fort Worth, Tex., formed a temporary organization at a meeting held in the Board of Trade Building on November 23. H. E. Crowley, of the Texas Sales Company, was elected temporary chairman and Earl Vernon temporary secretary. A membership committee of three was also appointed to call on all of the local dealers.

The Louisville Automobile Dealers' Association has decided to hold a show either in March or early in April, probably in the armory. Last spring the show plans of the association were frustrated by inability to secure a proper show building, and instead of a regular show a dealers' opening week was arranged, together with an automobile service between the various salesrooms, which proved fairly satisfactory.

#### Garage Notes.

Allentown, Pa.—The Allen Motor Car Company's garage on Tenth and Hamilton streets has been completed. The company are agents for the Studebaker cars.

Appleton, Wis .- The Griffin-Scott Company has been organized to assume the Outagamie district agency for the Buick, held by J. E. Stanton & Son. The new firm has purchased the Ullman Building, occupied as garage and salesrooms by the Stanton concern. Chester I. Scott and Harry Griffin, in Appleton, are the new owners.

Beaumont, Tex.—The Neches Motor Car Company, successors to the Texas Motor Car Company, will make extensive alterations and additions to their garage on Orleans street.

Beeville, Tex.—The Beeville Automobile Company are erecting a 40x150 foot garage with concrete floor.

Baltimore, Md.—The Automobile Outing Company have erected a garage and showroom on Charles and St. Paul streets. The building is of ornamental design and is fireproof throughout.

Baltimore, Md.—The McMullen-George Automobile Company will open a garage and repair shop at 542 Tyson street. They are agents for the Stearns cars.

Binghamton, N. Y.—Upon the completion of the new Whipple building that is being erected by R. W. Whipple, of the Binghamton Automobile Company, a salesroom and thoroughly equipped repair shop for Packard cars will be established here. The establishment will be similar in most respects to the Packard branches in other large cities.

Boston, Mass.—W. L. Russell & Co., who have the agency for the Apperson cars, have opened salesrooms at 169 Huntington avenue.

Buffalo, N. Y.—A fire in the garage of William J. Conners, at 723 Delaware avenue, destroyed three automobiles and damaged a fourth, causing an automobile loss of \$12,000 and a garage loss of \$3,000. The cars were insured for \$17,500 and the garage for \$5,000.

Buffalo, N. Y.—John Lehman is to build a 30x60 feet brick garage at 40 West Seneca street, at a cost of \$3,000.

Buffalo, N. Y.—C. S. A. Coe has broken ground for the erection of an addition to the public garage at 44 Leroy avenue, to cost \$3,000.

Cherokee, Okla.—Van Lee Hood has the contract for the erection of a 25x100 feet brick garage on the lot next to the Frey building.

Cherokee, Okla.—The Fisher Automobile Company are building a \$5,000 garage. They will handle several lines of cars.

Cincinnati, Ohio.—A Ford branch is being opened in this city by Louis C. Block, manager of the Philadelphia Ford branch, who will also be in charge of the branch

Cleveland, Ohio.—The Baker Motor Vehicle Company will establish city salesrooms and a garage in the building now in course of erection at the corner of Euclid avenue and East Seventeenth street.

Columbus, Ohio.—Roy Patterson, a former newspaper man of Newark, Ohio, has purchased the garage business formerly conducted at 121 South Third street, by F. H. Lawell. Mr. Lawell is the leading spirit in the Franklin Motor Car Company, organized to handle the Franklin and Reo, in a different location. Mr. Patterson has taken charge of the business and is conducting a repair shop and renting agency.

Dallas, Tex.—The Ford Motor Company have closed a five years' lease for a two story stone building in course of construction at 443-45 Commerce street, which will be completed by January I.

Dallas, Tex.—The Holcker-Elberg Company, of Kansas City, Mo., will establish a branch here. A three story brick building will be erected on Commerce street, between Pearl and Harwood streets, which will be supplied with electric elevators and all modern improvements. The cost will be about \$15,000.

Detroit, Mich.—A 60x200 feet garage is to be erected for the Security Auto Company on Woodward avenue, near Warren street, to be ready for occupancy February 15. The principals of the firm are John A. Sibley and W. J. Casterton. They will handle the Everitt "30." The company have opened temporary quarters at 872 Woodward avenue.

Detroit, Mich.—The Packard Motor Car Company are erecting another addition to their plant, on the Boulevard, between Concord and the railroad. The building will be five stories, of reinforced concrete, and will cost \$65,000.

Flandreau, S. Dak.—H. O. Ekern and Fred Gulzow will conduct a garage in the Will Rowe livery building.

Garretson, S. Dak.—Lyman Bowen, of Beaver Creek Township, Minn., has bought a Ford touring car to use in connection with the livery stable and garage he will conduct here.

Green Bay, Wis.—Malchow & Zimmerman, of Oskosh, Wis., who recently purchased the automobile department conducted by the Gottfredson Brothers Company, wholesale hardware, have reopened the garage under the title of Green Bay Motor Car Company. The Gottfredson garage has been entirely remodeled and a repair shop and accessory department added.

Green Bay, Wis.—"The West Side Garage" is the name of a new concern established by Louis Indra and Carl Jones. They will handle agencies, do a livery business and make specialties of tire repairs and vulcanizing. Mr. Jones has been manager

of a large garage at Oshkosh for eight years.

Harrisburg, Pa.—The Houston Launch Club broke ground last week for the erection of a garage to accommodate the cars of its week-end members.

Hillsborough, N. H.—S. H. Baker is erecting a public garage.

Houston, Tex.—The Houston Motor Car Company have found it necessary to again enlarge their charging plant for recharging electric cars. They have the agency for the Columbia electrics.

Houston, Tex.—The Parmele-Wroe Automobile Company have taken temporary quarters in the old church on the corner of Capitol and Caroline streets, while awaiting the completion of a new building uptown.

Indianapolis, Ind.—The Reliable Auto Exchange, which was organized some time ago, has just leased the building at 820 East Washington street. It is a three story brick, fireproof structure and said to be well adapted to automobile business purposes. A garage and sales business will be conducted. The company is capitalized at \$25,000, with John A. George, Roy C. Shaneberger and Oliver F. Shaw as the owners.

Kansas City, Mo.—The Hollister Motor Car Company, of 624 East Fifteenth street, have moved to more commodious quarters at 1708-10 Grand avenue. They conduct an agency for the Great Smith

Kansas City, Mo.—The Midland Motor Car Company, who handle the Peerless, Chalmers-Detroit and Hudson, have opened new headquarters at 1523-25 Grand avenue, where they have 30,000 square feet of floor space in a two story building.

Madison, Wis.—The new garage being erected for George H. Pregler, West Johnson street, near Henry, will be ready for occupancy soon. It is a two story building, 60x100 feet, with a large basement for repair shop. A turntable and electric hoists are features of the equipment.

Melrose Park, Pa.—Herman Buchborn has invited bids for the erection of a two story stone garage on his property.

Milwaukee, Wis.—Patrick Cudahy, a wealthy meat packer, sustained a loss of \$15.000 when his private garage was destroyed by fire. Two cars, an electric and a gasoline automobile, were ruined. The fire is believed to have been caused by defective wiring in an electric recharging board.

Milwaukee, Wis.—The Bland-Mueller Auto Company, Fourth and Poplar streets, has been merged with the Franklin Automobile Company, recently incorporated to handle the Franklin in Wisconsin. The new concern will have one of the largest tire repair plants in the Northwest, besides a large general repair shop and accessory department.

Newark, N. J.—Adrian Riker has given the contract for the erection of a two thory \$7.000 garage.

New York, N. Y.—Dorman L. Ormsby has taken a lease on a one story garage now in course of construction on 151st street, east of Amsterdam avenue. The building will be 50x100 feet and will cost \$10.000.

Norristown, Pa.—Eli Cassel has purchased the property adjoining his wheel shop, upon which he will erect a modern garage with a frontage of 125 feet.

Philadelphia, Pa.—P. J. McGarvey has let the contract for the erection of a two story garage at 1229-33 Belmont avenue, at an estimated cost of \$15,000.

Philadelphia, Pa.—The Chalmers-Fanning Company has been dissolved and has been succeeded by the Chalmers Motor Company, composed of Hugh Chalmers and George W. Hipple. Mr. Hipple is also a member of the Levy-Hipple Motor Company, of Chicago. Mr. Chalmers is the president of the new concern, which occupies spacious quarters at Broad and Vine streets, handling the Chalmers-Detroit.

Philadelphia, Pa.—The Hoopes Motor Company has been organized here by Henry R. Hoopes, formerly of the Crawford Automobile Company, to handle the Rambler. The new concern takes over all of the assets of the Crawford Company and will occupy the quarters of the former company at Broad street and Fairmount avenue, which have been completely remodeled. Mr. Hoopes will continue to handle the Crawford.

Pittsburg, Pa.—The Park Garage, on West Ohio street, has passed into new hands, and the new management will put the garage and machine shop in first class condition.

Pittsburg, Pa.—The Premier Sales Company, Ltd., agents for Premier and Reo cars, moved into their new quarters on Beatty and Mignonette streets, one block south of Pennsylvania avenue.

Portland, Ore.—M. B. Duffield has purchased the interest of Cuthbert & Smithson and will hereafter handle the Hupmobile cars here.

Reading, Pa.—Elias R. H. Holtzman has purchased the Blimline property and will open a garage.

Rochester, N. Y.—The Gillis-Strick-land Motor Company have applied to Fire Marshal Pierce for a permit to build a one story 33x203 garage on Clinton avenue South, at an estimated cost of \$9,600.

St. Charles, III.—A contract for the new E. J. Hahn garage building, to be erected on the present site of the Hahn shop in West Second street, has been let.

Sheboygan, Wis.—A. G. Maurer formally opened his new garage on Niagara avenue last week.

Syracuse, N. Y.—The Franklin Automobile Company have leased the Crosby garage at Montgomery and Water streets, which they will equip with modern machinery to be operated by electric power. There will be an elevator and every convenience for handling second hand cars, which they intend to display in connection

with the repair shop. A new show room will be erected later.

Tacoma, Wash.—The Winton Motor Car Company have established a salesroom at 705 Pacific avenue. Messrs. Detweller & Rushmore are the Tacoma agents.

Utica, N. Y.—An injunction restraining Harry M. Levengston, of Saratoga Springs, from erecting a garage at the corner of Plant and Hart streets, this city, was granted last week by County Judge Pritchard, on motion of R. R. Martin, attorney for Richard W. Sherman, who resides near the location of the proposed garage. Mr. Sherman contended that the continual chugchug of automobiles day and night would be an intolerable nuisance in the residential district. He also asks that the restraining order be made permanent.

Vergennes, Vt.—W. H. & W. S. Bristol are soon to open a garage and repair shop under the management of G. E. Glaser, of Buffalo. N. Y.

Waterford, Wis.—Hamm Brothers will open a garage and agency in the Moe Building as soon as improvements are completed. Both are expert machinists and will make a specialty of repair work.

Waynesburg, Pa.—The Hoover Automobile Company are now installed in their new two story brick garage on South Morgan and High streets. The building is 60x72 feet with cement floors and is absolutely fireproof. The first floor is used for offices and repair shop, and the upper floor for storage.

W. Burke, Vt.—A. C. Griffin has built a garage near the hotel.

Wilkes-Barre, Pa.—The Lehigh and Wilkes-Barre Coal Company was awarded a building permit for the construction of a garage on the company's grounds on South River street.

#### New Agencies.

TRENTON, N. J.—Driscoll & Twist, Hupmo-bile.

CANTON, MINN.—Dunford & Knudson, Buick.

MERIDEN, CONN.—Brown & Underwood, Stearns.

FINDLAY, OHIO.—Electric Construction Co., Speedwell.
COSHOCTON, OHIO.—S. Siegert & Sons.

Speedwell.
ATLANTA, GA.—The National Motor Sales

Co., National.

DULUTH, MINN.—The Russell Motor Co.,

Wilcox trucks.
ABERDEEN. S. DAK.—The Aberdeen Auto-

mobile Co., Franklin.

TOLEDO, OHIO.—Frank Hilt, Tenth and Madison streets, Speedwell.

CANTON, OHIO.—Canton Motor Car Co. 113 Fifth street, Speedwell. COLUMBUS, OHIO.—Kimmel Brothers, 170

COLUMBUS, OHIO.—Kimmel Brothers, 170
North Fourth street, Speedwell.

HAMILTON, OHIO.—Central Motor Co., 26 North Second street, Speedwell.

CLEVELAND, OHIO.—Park Motor Car Ca.
1021-5 Superior street, Speedwell.

ST. JAMES, MINN.—The St. James Automobile Co., Ford, Buick and Brush cars.

CINCINNATI, OHIO.—The Speedwell Motor Car Co., 228 East Sixth street, Speedwell.

ST. JOSEPH, MO.—The Wells-Farmer Antomobile Co., corner of Thirteenth street and Frederick avenue, Ford, Rambler and Maxwell.

### NOTES OF THE INDUSTRY AND THE SPORT.

The Cadillac Motor Car Company inform us that their average output for this season will be very close to 900 cars per month.

The Howard Rim Company, of Trenton, N. J., have opened a sales office in Philadelphia at 1411 Race street, in charge of H. T. Eisenberg.

H. T. Alexander & Co., 17 State street, New York, who formerly used the trade name Panhard for their lubricating oils, have adopted the name "Speedway" instead.

The Nielsen Motor Car Company has been incorporated in Detroit with a capital stock of \$50,000. The company controls two patents relating to automobile parts.

The Greyhound Motor Works, of 1443 Niagara street, Buffalo, N. Y., manufacturers of motorcycles, have acquired the plant formerly occupied by the Auto-Bi Company.

The K-W Ignition Company, of Cleveland, Ohio, announce the receipt of an order for 500 of their magnetos from the Ferro Machine and Foundry Company, of the same city.

The Watt Motor Car Company has been formed in Detroit, by F. J. Watt, of the Watt-Detroit Carburetor Company, to manufacture a six cylinder car, and are considering the building of a factory.

The Detroit Magneto Company, whose incorporation was announced in our last week's issue, have taken over the business of the Struther Magneto Company, and are located at 11-23 Raynor street, Detroit.

A retreading pot in the vulcanizing plant of the Wisconsin Tire Repair Company, 168 Main street, Oshkosh, Wis., exploded last week, causing \$500 to \$1,000 damage. No one was injured. Repairs have already been made and there was no interruption.

F. C. and Edwin Vandewater, who have been manufacturing the Correjacar in a small way in Iselin, near Rahway, N. J., for several years, have removed to Elizabeth, N. J., where they have secured the Heidritter Building, on Prince street, which contains about 40,000 square feet of floor space.

A building now occupied as a repair shop by the Buick Motor Company, has been purchased by the Prest-O-Lite Company in Indianapolis. The latter expects to use the building as a warehouse, after making extensive improvements. It is 44x195 feet and is located at Henry and Alabama streets.

A fire occurred at the Boston Gear Works, Norfolk Downs, Mass., on November 27, which partly destroyed the plant, but about 75 per cent. of the tool equipment was saved and the firm were partially running again in two days after the fire. They hope to be doing their regular work

again in six to ten days from the fire, and inform us that they are not cancelling the majority of their orders.

Ralph Rogers, who formerly built a high wheel car in Chicago, has formed the Rogers Motor Car Company, which will locate in Ralston, Neb., a suburb of Omaha. Five local business men are interested in the new company, including the Ralston brothers, who conduct a garage in Omaha. It is expected to have the first cars out by next spring.

The Firestone Tire and Rubber Company, of Akron, Ohio, have established agencies for their tires and demountable rims with Whitaker Tire and Rubber Company, 121 Union street, Memphis, Tenn.; Central Automobile Company, Vancouver, British Columbia, and Harris Tire Company, corner Perry and Drayton streets, Savannah, Ga.

George P. Hewitt, 509 Matthews building, Milwaukee, Wis., a Buick representative in Wisconsin, is advertising for skilled mechanics on behalf of the Buick Motor Car Company, of Flint, Mich. The demand for all kinds of labor is so strong in Milwaukee and the suburbs, however, that it is practically impossible to procure men for outside industries.

The Falls Machine Company, of Sheboygan, Wis., is installing several large machine tools and grinding equipment in order to take care of an order for 1,000 motors from a Detroit automobile factory. The company has been building automobile engines for some years, but this order is the largest it has ever received. It may be necessary to build several additions.

The first prize offered by the New York Herald in connection with the recent New York-Atlanta tour has been awarded to Mercer County, New Jersey, the best stretch of road north of Roanoke, Va., having been encountered in that county. The second prize, of \$500, was awarded to Jefferson County, West Virginia, and the third prize, of \$250, to Rockbridge County, Virginia.

The Fisk Rubber Company, of Chicopee Falls, Mass., have concluded arrangements with an anti-skid chain manufacturer for the manufacture of a chain which is anchored neither to the tire, nor rim, the tread cross pieces being longer than the usual type, so that they cover a large surface of the tire, whereby damage to the tires is claimed to be avoided. This chain will be handled by the Fisk Company.

The Racine Manufacturing Company, of Racine, Wis., are adding new buildings to their plant for the manufacture of automobile bodies, limousines, taxicabs, coupés, touring bodies, dashes, and battery and tool containers. The force of employees will be increased to 1,650. The company now owns nine buildings, covering eleven acres.

Eight buildings are four stories high and the ninth is six stories high.

The Moon Motor Car Company, of St. Louis, Mo., have received from C. M. Garland, professor of engineering at the University of Illinois, a dynamometer for testing the motors of the company. A similar dynamometer is said to be in use in the engineering school at Cornell University.

The Standard Automobile Company of America plan to remove from St. Louis to Wabash, Ind. The Wabash Exchange is selling a number of lots in the Fairview addition for the purpose of raising the money necessary to secure the factory. The company will turn out a car costing \$2,000, for which they claim to have orders for 400.

E. M. Clark and C. B. Richardson, of Philadelphia, are endeavoring to interest capitalists of Owosso, Mich., in a factory for light motor trucks and delivery wagons, to be located in that city. A meeting was held at the Owosso Improvement Association on December 1 to consider the proposition.

The Western Motor Works, which established a branch factory in Marion, Ind., nearly a year ago, have made their first report to the Marion Chamber of Commerce, in accordance with a contract with the latter. During the past half year an average of eighty men have been employed and at the present time ninety-five are on the pay roll, according to this report.

#### Club Notes.

The Oklahoma A. A. will give its annual banquet in the hall of the Chamber of Commerce in Oklahoma City about December 10. The association is fostering a license law providing for a license fee of \$5 per vehicle per year, the revenue from which is to go into the State road fund.

The Denver Motor Club advertises in the local papers offering a reward of \$100 for the conviction of anyone using a machine belonging to any member of the club without the owner's permission. The club is also on the lookout for petty thieves who steal tools, lamps, robes, etc., from automobiles.

The Long Island A. C. held its annual meeting at the clubhouse at 920 Union street, Brooklyn, on December 1. During the past year 294 names were added to the list of members, an increase of 62 per cent. Allen C. Alderman won the prize for having brought in the largest number of new members in 1908, and again won the trophy for 1909. The mileage cup was won by William C. Bolton, who covered 11,150 miles during the season. The following officers yere elected: Allen C. Alderman, president; Louis T. Weiss, vice president;

C. S. Cavanagh, secretary, and Chas. C. Cluff, treasurer.

The Quaker City Motor Club has sent an invitation to Governor Stuart, of Pennsylvania, to attend its second annual banquet on January 6

The A. A. A. has secured additional room in the building at 437 Fifth avenue, New York, where its headquarters are located. The contest board, the touring information board and the editorial offices of the association's monthly publication will be located there.

The Denver Motor Club is planning the following events for the coming year: Two road races, one on Decoration Day and the other on Labor Day; a reliability contest in June; a gasoline economy contest in October, and a hill climbing contest in November.

The Will County (Ill.) Automobile and Good Roads Association was organized at a meeting held at the Commercial Club in Joliet, Ill., on November 26, with Sebastian Lagger as president. The association will inaugurate an active campaign in the interest of good roads in the county.

The Minneapolis A. C. has adopted a resolution requesting the city to repair University avenue, between Nineteenth avenue Southeast and Twenty-fifth avenue, and has indorsed the completion of the paving on Lyndale avenue, Crystal Lake avenue, Hiawatha avenue and Thirty-fourth street.

The Chenango County Motor Association was organized at a meeting held at the garage of the Norwich (N. Y.) Motor and Machine Company on November 29. The following officers were elected: Henry R. Follett, president; Frank S. Powell, vice president; H. Gilbert Mahan, treasurer, and Charles H. Latham, secretary.

The Colorado Springs A. C. has started a campaign to raise \$5,000 for the completion of the new road from the Springs to Cañon City. The funds set aside for the purpose by the Legislature have been exhausted, and in order to keep the convicts at work on the road until the Legislature meets again and can appropriate further sums the above amount will be necessary.

The Minneapolis A. C. has posted notice that it will give a reward of \$50 for any information leading to the arrest and conviction of any person unlawfully taking, stealing or tampering with any automobile within the city of Minneapolis. This action, which was decided upon by the trustees at a meeting held on November 30, is directed at the practice of "joy riding" which is said to be very prevalent in the city.

The Buffalo Motorcycle Club held another meeting Wednesday evening, December 1. The total membership has increased to 127 members. The nominations for officers for the coming year were accepted. William Mevius' design for pin and emblem was accepted. The colors of the club are to be pearl gray and maroon. Albert Johnhale was appointed captain for the coming season. All persons becoming

members of the club before January 1, 1910, will be considered charter members

The winter social season of the New Jersey Automobile and Motor Club was opened on December 2, with a smoker and vaudeville entertainment at the clubhouse, Park place, Newark.

### New Incorporations.

The Speedwell Motor Car Agency Company, Cincinnati, Ohio.—Capital stock, \$7,500.

The Raleigh Motor Car Company, Charlotte, N. C.—Capital stock, \$25,000. Incorporators, Dr. A. W. Goodwin and others.

The High Point Auto Sales Company, High Point, N. C.—Capital stock, \$50,000. Incorporators, H. A. White and A. M. Briggs.

Columbus Auto-Electrical Company, Columbus, Miss.—Capital stock, \$10,000. Incorporators, W. W. Garth, D. A. Hunt and others.

The Mitchell Automobile Company, Madison, Wis.—Capital stock, \$20,000. Incorporators, A. Bonnell, of Milwaukee, and others.

The Omaha Automobile Show Association, Omaha, Neb.—Capital stock, \$2,500. Incorporators, R. R. Kimball, J. J. Deright and J. L. Steward.

The Communipaw Motor Car Company, Jersey City, N. J.—Capital stock, \$10,000. Incorporators, John Nelson, William J. McIntyre and Ida N. Nelson.

The Chicago Auto Top Company, Chicago, Ill.—Capital stock, \$5,000. Incorporators, A. L. Scharpe, Albert Horat and Isaac Anderson Loeb.

The Citizens' Automobile Company, Indianapolis, Ind.—Capital stock, \$1,000. Incorporators, McDonald Purcell, Samuel D. Pierson and William H. Stafford.

The Lowell Auto Body Company, Grand Rapids, Mich.—Capital stock, \$30,000. Incorporators, Albertus H. Peckham, H. Algernon Peckham and Robert J. Flanagan.

Webb Motor Fire Apparatus Company, St. Louis, Mo.—Capital stock, \$300,000. Incorporators, A. C. Webb, D. B. Blossom Frank R. Tate, John O. Glanville and H. W. Femmer.

The Carpenter Motor-Vehicle Company, Brooklyn, N. Y.—Capital stock, \$10,000. Incorporators, H. L. Carpenter, Henry R. Price, J. N. Carpenter, James P. Lough and C. D. Wood, Jr.

The Demotcar Company of New Jersey, Trenton, N. J.—Capital stock, \$1,000,000. Incorporators, Frank T. Lodge, Stanton Clarke and John G. Krieg, all of Detroit, and John A. Hartpence, of Trenton.

The Jenkins Emergency Wheel Company, Richmond, Va.—Capital stock, \$40,000. Incorporators, Felix Keegan, W. F. Jenkins, John C. Hagan, John J. Blake, L. L. Kelley, J. N. Brenaman and E. Donahue.

The Atlanta Motor Car Company, Atlanta, Ga.—Capital stock, \$250,000. Incorporators, Dr. N. P. Moss, of Fayetteville, La.; J. N. Roussel, F. L. Sawyer, Craw-

ford Wheatley, W. P. Mills, George P. Petty and Arthur Bussey.

The Invincible Storage Battery Company, Chicago, Ill.—Capital stock, \$5,000.

The Motor Company of Salt Lake, Salt Lake City, Utah.—Capital stock, \$50,000. Incorporators, A. E. White, M. H. Kriebel and E. G. Palmer.

Barnett Automobile Tire Company, New Rochelle, N. Y.—Capital stock, \$80,000. Incorporators, Frank A. Barnett, P. W. Barnett and P. J. Leahon.

The Motor Company, Salt Lake City, Utah.—Capital stock, \$50,000. Incorporators, A. F. Savage, A. E. White, M. H. Kriebel and E. G. Palmer.

The Dellamore Motor Car Company, Los Angeles, Cal.—Capital stock, \$25,000. Incorporators, A. Dellamore, E. M. Dellamore and William Dellamore.

The Beyster-Detroit Motor Company, Detroit, Mich.—Capital stock, \$50,000. Incorporators, Henry E. Beyster, Benson E. Brown and Herbert C. Munro.

The Detroit Magneto Company, Detroit, Mich.—Capital stock, \$100.000. Incorporators, F. G. Baillie, M. Fletcher, E. M. Tyler, John A. Lotz and A. A. Fletcher.

The Southern Motor Sales Company, Louisville, Ky.—Capital stock, \$10,000 Incorporators, W. F. Blackford, A. L. Martin, George H. Bohannon and C. C. English.

The M. & M. Company, Cleveland, Ohio.

—To deal in automobile parts; capital stock.

\$15,000. Incorporators, C. S. Machner, R.

A. Wilbur, J. C. McLean, A. S. Dole and

F. B. Graham.

The Overland Motor Company, Boston. Mass.—Capital stock, \$25,000. Incorporators. Charles G. Andrews, of Everett; George A. Patten and Manley A. Jackson, of Chelsea, and James M. Linscott.

### Trade Personals.

O. P. Bernhart, vice president of the Croxton-Keeton Motor Company, Massillon, Ohio, is on a trip through the West in the interest of the company.

Wally Owen, the well known racing driver, has signed a contract with the Rainier Motor Company, and will sell Rainier cars from the Sixty-fourth street, New York, headquarters.

Paul N. Lineberger, vice president of the Rainier Motor Company, has just returned from a trip through the South, on which he appointed State agents for the Rainier car in Georgia and Alabama.

George L. Crook, formerly general superintendent of the Fairbanks-Morse Company, at Beloit, Wis., later of the International Harvester Company, as general manager of the gas engine plant at Milwaukee, and recently in charge of the manufacturing organization in the E.-M.-F. plant at Detroit, Mich., has entered the employ of the M. Rumely Company, manufacturers of motor tractors and agricultural machinery at La Porte, Ind., as works manager.

# The Horseless Age

First Automobile Journal in the English Language

UME XXIV

NEW YORK, DECEMBER 15, 1909

NUMBER 24

# Irregularities in the Motions of Transmission Members.

By S. Gerster.

gularities in the motions of transon members are due to irregularithe speed of the motor, to variain the position of the driving axle espect to the frame, and to the arment of the linkage between the and axle. The accelerations and rations of the motor are not of

importance as vent the properation of the ete mechanism. Her the motored with a govor not the es in speed are s gradual and the controled driver.

irregularities the arrangeof the transon members are imes quite and appreci-They are due balancing of body on the and the and have a bad on the durabilthe parts. Two of irregulariust be consideparately, viz.: Those due to niversal joint. Those due to ertical play of riving axle.

irregularities to the univeroint are the or the more the lier shaft is ed. When only agle universal is used it is

sible to eliminate this irregularity.

1-8 illustrate an apparatus which instrates in what manner it is possion obviate this defect by means of e universal joints. Figs. 1-4 show pparatus with the two forks on the ller shaft perpendicular to each

In Fig. 2 it will be seen that the ndicator hands are at the vertical

division; for one-eighth of a revolution of the driving indicator hand (Fig. 3) the driven hand has advanced more than 45 degrees, but after a quarter turn of the driving hand the driven hand is again in line with it, both being horizontal (Fig. 4).

During the first of the eight periods

where  $\omega$  is the velocity of the driven shaft and  $\alpha$  the angle of the propeller shaft with the horozintal.

Figs. 5-8 show the apparatus with the forks of the propeller shaft in the same plane, in which case the periodical errors of the two joints compensate each other. Fig. 7 shows the two indicating hands at

45 degrees, and they both move at equal velocity at every instant. In order to secure even driving it is therefore necessary to key the two universal joint forks at the opposite ends of the propeller shaft so that they are in the same plane.

The irregularities due to the motion of the axle with relation to the chassis frame are smaller or greater according to the general arrangement of the drive. As the driving axle approaches to the frame and recedes from it, the driving shaft is accelerated or retarded in speed. This variation is greater the more the axle is displaced, and the more rapid its displacement the greater the strain on the parts.

In order to make a thorough study of the speed variations with the different arrangements of linkages, the writer had

made scale models of the different types of vehicles in use. In all of these models the distance between the change gear box and the rear axle is substantially the same. The models were constructed for a spring play of 6 inches.

Figs. 9 and 10 show a model of a chain driven car. The first figure shows the model in the normal position, and the

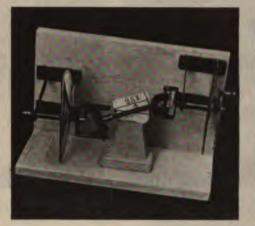


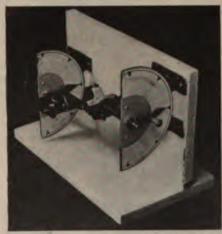
Fig. 1.



Fig. 2.



F1G. 3



F15. 4.

the driven shaft is accelerated; during the second and third it is retarded, and during the fourth it is accelerated; the same applies to the fifth, sixth, seventh and eighth periods. The maximum angular velocity  $\omega$  of the driven shaft at any instant is given by the formula

$$\omega_1 = 2 \frac{\omega \times \cos \alpha}{1 - \sin^2 \omega \sin^2 \alpha}$$



VELIE REAR CONSTRUCTION SHOWING ACCESSIBILITY OF DIFFERENTIAL,

independently. A crank case compression relief and oil filler is located on the left front motor hanger arm.

The clutch is, as above stated, of the three dry type, with a slip square between it and the transmission, and a brake that works in unison with the pedal and stops the shaft from spinning, thus permitting the gears to be changed quietly. The slip square gives a universal action between the clutch and transmission, preventing the binding of transmission gears over rough and uneven roads.

The transmission is of the selective three speed type, with both shafts carried on Timken short series roller bearings. The gears are 3½ per cent, nickel steel, hardened and ground.

The propeller shaft between the transmission and rear axle is provided with two double universal joints of the cross and roller type, the transmission and drive pinion shaft ends being squared.

The rear axle is a Timken full floating type, with the differential casing and wheels carried on Timken roller bearings. The front axle is a drop forged I section Timken axle, with steering arms located behind and above the axle. The brakes work through equalizers on the rear wheel drums, and are internal expanding and external contracting, respectively, and operated in the usual manner. The front springs are semielliptic, 2 inches wide and 38 inches long; the rear springs are three-quarter scroll elliptic, 2 inches wide and 46 inches long. The wheel base is 115 inches, and a 34x4 inch quick detachanble tire equipment is furnished.

### Milwaukee Tool Grinder.

These tools have an iron case very accurately machined, and when assembled are oil tight, which protects the gears and bearings from the fine dust from the emery wheel and holds the oil, keeping the bearings lubricated and reducing the wear to a

minimum. The driven shaft that also carries the grinding wheel is supported at both sides of the driven pinion by liberal bearings. The driving gear is also supplied with two bearings, one on either side on



the crank shaft. At the lower part of the case are two projecting prongs which rest on a cable or bench, and below this is a thumb screw which sets up against the bottom and permits of quickly fastening or removing the grinder from any beach or

table. The gears are all accurately machined and mesh perfectly, thus causing them to run quietly and smoothly with very little friction. The ratio of the gears permits of very high speed of the grinding wheel, with low speed of the crank. The universal tool rest is claimed to be strong and simple, and can be set on either side of the wheel and adjusted to any angle or position desired. These grinders are made by the Garage Equipment Manufacturing Company, of Milwaukee, Wis.

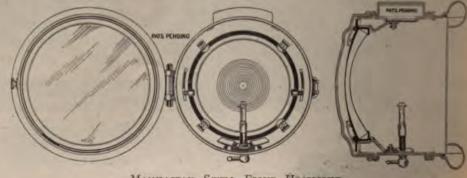
### Manhattan Swell Front Headlight.

We illustrate herewith the new swell front design of double metal headlight made by the Manhattan Screw and Stamping Works, West End avenue and Sixtyseventh street, New York city, for 1910. The lamp consists of two full shells, each supporting the other, and is claimed to be twice as strong as a single shell lamp. By rolling in the swell front to a smaller diameter than the body, the side shadows and side glare are said to be cut out. Great pains have been taken in the design to insure a clean lamp. The expanding collar permits of the use of a solid front glass. The flat flame burner is claimed to be impossible to choke, and it is also claimed that it will not crack the glass or the mirror. All bolt heads, screw heads and couplings are on the inner body, and the outside is therefore smooth and clean.

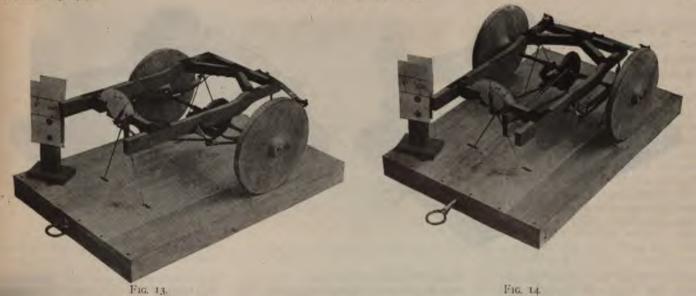
### Personnel of Owen Motor Car Company.

The Owen Motor Car Company, which, as announced in a recent issue of The Horseless Age, has been organized in Detroit by Ralph Owen and the Smith Brothers, who were formerly connected with the Olds Motor Works, of Lansing, Mich., will turn out a 52 horse power, long stroke car, to sell at \$3,200. The officers of the company are Edward Turnbull president, Angus Smith treasurer, and Ralph Owen general manager. The company have bought a nine acre plot on the boulevard on which there is a four story 60x150 foot factory building. It is planned to turn out 500 cars next year.

The space in the lobby of the Hotel Breslin, New York, will this year be occupied by a Premier during the Palace Show, and a Chalmers during the Garden Show.



MANHATTAN SWELL FRONT HEADLIGHT.



direct drive. The trained ear of the driver may hear and distinguish the noises resulting from play in the universal joints, in the driving gears or between the sliding members and their shafts. When the car is driven across a cross gutter, without the clutch being disengaged, a shock of short duration is produced, and the novice driver often wonders what may be the cause of this, without being able to satisfactorily explain the action. A well designed and well built change speed gear would withstand these shocks without producing any noise, even on a road in bad condition.

The writer has made some experiments with a change gear mounted with a linkage similar to that of Figs. 13 and 14. A noise was heard in the gearing, due to the unevennesses of the road. By discarding the linkage and adopting that shown in Figs. 17 and 18 this noise was entirely stopped, and the suspension of the frame was improved without changing the springs.

Fig. 19 shows the under side of the apparatus and the cords attached to the frame in order to insure absolutely vertical displacement in imitating the compression of the springs.

If we suppose that the motor runs ab-

solutely regularly, at each oscillation of the rear axle a torsional effect is produced in one direction or the other. When the axle moves away from the frame the motor is suddenly relieved of its load and tends to accelerate; as soon as the axle approaches the frame again the motor takes up its load again and is pulled down to its normal speed, and below if the axle approaches the frame more closely than its normal position. This latter case occurs when the rear wheels

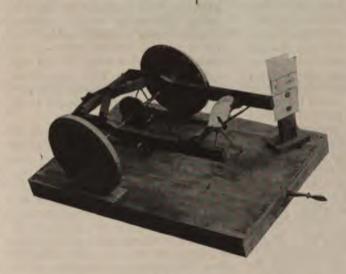


Fig. 12.



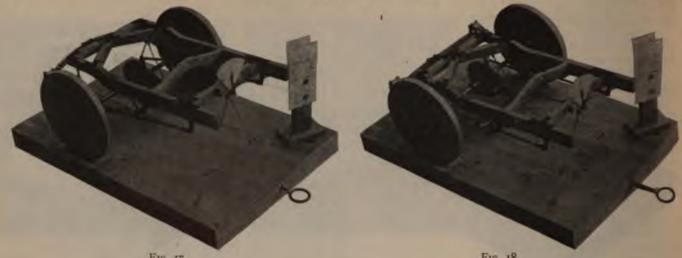


Fig. 17.

emerge from the cross gutter. order to obtain an accurate idea of the influence which the above described oscillations may have, the writer had constructed an apparatus which permits of correctly registering the time and the amplitude of these oscillations. This apparatus, Fig. 20, consists of a registering drum on which a needle traces a diagram. The rapidity with which this apparatus operates necessitates the adoption of some other driving system than a clock movement, as the irregularity of an escapement motion would be noticeable. A friction wheel movement would be inapplicable, as the vibrations would affect the speed of the drum. The writer found another means for operating the drum. The apparatus is driven from the front wheels of the vehicle by means of a roller engaging with a drum secured to the hub of the road wheel. In the illustration the driving friction wheel is seen in front of the apparatus. On the car the assembled apparatus is placed in front of the driver's seat. As each depression or prominence of the road produces an acceleration or retardation in

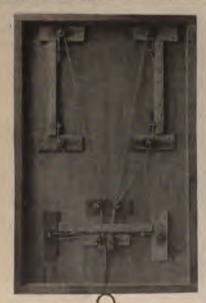


Fig. 19.

speed I introduced an elastic drive and a flywheel, which steadies the motion. The speed at which the diagram sheet is moved is calculated from the indication of the magnetic speedometer placed on top of the apparatus. The end of the registering arm is tensioned by means of a spring. Below the spring is attached the operating cord, which, passing over grooved pulleys, has its other end attached to the driving shaft. Things were so arranged that the draft was vertical above the axle. A step pulley gave a reduction of the scale to the height of the

The diagrams obtained show in the direction of their length the motions of the vehicle, and in the direction of their height the displacement of the axle relative to the frame. If we examine the diagrams, Figs. 21 and 22, we notice that there are undulations, vertical lines and even loops. The later are due to an imperfection in the apparatus, which cannot be taken into account. The vibrations affect the support of the drum, which gives rise to this effect.

Figs. 21 and 22 show diagrams taken in passing over a double cross gutter, represented by Fig. 23. The diagram, Fig. 21, was obtained at a speed of 21 miles per hour. The diagram, Fig. 22, was obtained under the same conditions, but at a speed of 30 miles per hour. By comparing the two diagrams it will be observed that the oscillations are produced at the same depressions and the same prominences of the ditch. They are the more pronounced, and the closer together the faster the vehicle is driven across. The vehicle requires less time to pass the obstacle in the second dia-

Fig. 23 gives the form of the cross gutter. The dotted line above the ground indicates the motion of the centre of gravity of that portion of the vehicle above the axle. The higher the speed of the vehicle the more this line will be accentuated.

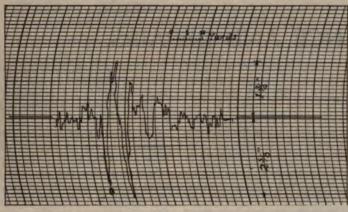
It remains to be shown in what way the oscillations which have thus been Fig. 18.

demonstrated to exist are detrimental. The vehicle with which the experiments were made weighed 1,790 pounds in front and 2,320 pounds in the rear. The motions of the axle in diagram Fig. 21 are not particularly dangerous, and we will therefore examine the oscillations of disgram Fig. 22. The greatest difference in speed is produced between the points A and B. At the point A the vehicle is in its highest position, the springs being extended to their maximum; at the point B. on the other hand, the vehicle is in its lowest position. The same letters are used to designate corresponding positions in Fig. 23. The line C-D indicates the normal height of the frame at rest; besides, it should be remarked that the curve of the diagram is above the line C-D when the motor is driving the car ahead. The curve is below the line for backward driving and braking. The motion of the axle is equal to 81/2 inches. which in the case of one of the first linkage systems above investigated corresponds to a rotation of the driving shift of 65 degrees.

The line A-B corresponds to a rota-



Fig. 20.



Speed, 21 M. P. H. = 10.4 yards P. S. The height of this diagram corresponds to 32.5 per cent, of the vertical motion of the axle.

tion in the direction of retardation of the motor. The time may be measured from the distance through which the car had progressed. In the case of our diagrams it is equal to one-sixth of a second. Let us investigate the importance of this figure. At 1,000 r. p. m. the motor shaft turns through an angle

a = 1000 × 360 = 360000° and for one-sixth of a second an angle of 360000 × 1 = 1000°

The driving shaft turns during the time represented by A-B (one-sixth second) through an angle of 1000 degrees at a constant speed. The motor of this same vehicle requires eight seconds to come to a stop, when running at no load, from the motion the ignition is cut off. The reduction of speed in degrees is there-

$$\frac{360 \times 1000}{60 \times 8} = 750^{\circ}$$
 per second,

 $\frac{750}{125} = 125^{\circ}$  for  $\frac{1}{2}$  second.

OF

The largest retardation in speed which

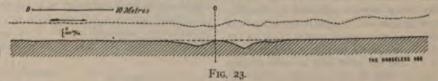
result is a shock to the vehicle in the

the motor may follow if its sustenance is cut off is therefore 125 degrees for onesixth second. The diminution in speed caused by the motion of the driving axle during the same period of time is 65 degrees. As the motor has a tendency to maintain its speed, it opposes a large resistance to this unexpected motion. The following moment. In the experiments the vehicle was running at 30 miles per hour. From a comparison of the two diagrams, Figs. 21 and 22, it is obvious that the oscillation of the axle increases with the speed at which the vehicle passes over the cross gutters. The distances of the peaks of the diagrams are the same, and are proportional to the distances passed through by the vehicle. The greater the speed the shorter the distances between peaks in relation to the time. Thus the writer

The motor readily follows its acceleration, which may be estimated at onequarter the acceleration of which it is capable when running free at this speed. This acceleration is very bad for the next

found that with a chain driven vehicle, as first described, it was impossible to cross a single ditch, 4 yards wide and 9 inches deep, without breaking the differential. There comes a moment when the propeller shaft stops, only to immediately resume its former speed. In one of the motor truck contests five differentials were broken on one truck in eight days.

The best method of eliminating these



forward direction. The transmission members take purchase on the mass of the flywheel on the one hand and on the ground and the mass of the vehicle on the other. The strain often becomes so great that the clutch slips. As soon as the point B is passed the axle moves upwardly and gives to the driving shaft a motion in the reverse direction, in the direction of rotation of the motor. The same motion was produced from O to A.

difficulties is to employ a linkage system, with which there is very little variation in speed. In addition to the most satisfactory systems above indicated, we may mention the double transverse Cardan shaft system of De Dion & Bouton, which produces an estimated error of not more than 3 degrees, which is due to the method of fastening the rear construction, the springs or the distance rods.

Some of the designers who became aware of these defects endeavored to overcome them by introducing into the drive (in the Cardan shaft, the driving connections to the wheels or in the universal joints) shock absorbing springs. The objection to these devices is that they are not strong enough at slow speed when the driving effort is very great, in which case they are compressed solid. For high speeds, when the torque transmitted is small, these springs are too stiff to give good results.

# o s royand 1 Decord

FIG. 22.

Speed, 14 M. P. H. = 14.8 yards P. S. The height of this diagram corresponds to 32.5 per cent. of the vertical motion of the axle,

### To Sell Orion Motor Trucks Here.

Henry Duccasse & Co., American agents for the Darracq car, have taken the agency in this country for the Orion commercial vehicles manufactured in Zurich, Switzerland. These cars are said to be used in large numbers in different parts of Europe, and are made in sizes ranging in carrying capacity from 1 to 6 tons. The Orion motor is of the water cooled, horizontal type, and is made in one and two cylinder models. The wheels of these cars are made entirely

1

# MAINTENANCE AND REPAIRS.

### Battery Efficiency.

BY JAMES S. MADISON.

After experimenting for a period covering eighteen months for the purpose of determining the best conditions for yielding high battery efficiency in automobile ignition, the writer has obtained results that are very satisfactory.

The experiments were conducted with dry cells in an automobile of the runabout type, largely for the reason that this type is a popular one, and that comparatively few of them are equipped with storage batteries or magnetos. The car selected for observation has a 14-16 horse power, two cylinder, four cycle engine, with a non-vibrating coil. The spark is formed by a "make and break" timer actuated by the cam shaft. When the two iridium "points" of the timer are brought into contact by the revolution of the shaft, the circuit being closed by such contact, the current passes. When the points are separated by the continued motion of the shaft the circuit is broken and the current ceases. One of the points is adjustable so that the opening between it and the other may be made greater or less, as may be desired. The shorter the distance between the two the longer the contact; the greater the distance the shorter the contact. If the contact be too brief the spark delivered to the cylinders will be too feeble to ignite the explosive mixture, or yield only an incomplete explosion. If the contact be too long, within comparatively wide limits, it will not affect the explosions, but it will consume a wasteful amount of current, and hence decrease the life of the cells. By a few simple trials it was discovered that the "points," as adjusted by the maker of the car, were too close, and that the battery consumption was entirely too great. The first set of four cells (each cell showing 0.6 volt and 20-25 amperes) gave a mileage of only 140! The ignition system of the car is shown herewith.

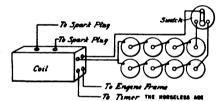
The arrangement was such that either battery, A or B, of four cells each, could be used, the advantage being that in case of a breakdown of one battery the other could be instantly used by moving the switch plug to the proper position.

### MILEAGE OF BATTERIES.

By this arrangement the mileage secured from four cells varied from 400 to 800 miles, the latter result being the highest that was obtained during the experiments. The average mileage was 600. It was possible to get this result only by observing carefully a number of precautions.

The method of procedure in installing a new set of cells was as follows: Originally a battery box was made that would just hold eight dry cells of the usual dimensions comfortably; it was provided with a par-

tition that divided it into two equal compartments. The bottom of the box is lined with two thicknesses of canton flannel. This makes a soft foundation that will absorb a great many shocks or jars that would otherwise reach the cells and aid in their deterioration. The space between each cell is firmly packed with clean dry waste. When it becomes desirable to replace the cells it is not necessary to remove the paper cylinders. The cells may be lifted out and the new ones slipped in without disturbing the packing. The box should always be kept in an upright position, so that each cell stands on its bottom, the position in which they are intended to stand. The cells are held firmly in this upright position by the flannel, the waste and a strip of wood, about 2 inches wide, that is secured by a single screw at each end of the top of the box. When a new set of cells is to be purchased each one is tested for its amperage, which should not be higher than 28 or lower than 15. The writer uses only one kind of cell, because the manufacturer of it is wise enough to stamp the date of its manufac-



ture on the bottom, thus protecting the consumer from stale cells. The brass carbon and zinc connections—each one of them—should be brightened with fine emery paper. It is important that the zinc connection should always be examined for the presence of pitch or sealing wax, which frequently becomes lodged there during the manufacture. When present it should be carefully removed. Further, each copper terminal should be polished with emery paper, and occasionally every terminal in the entire ignition system should be cleaned and polished. This will prevent much wasting of the current and a possible short circuit.

### MULTIPLE SERIES CONNECTION.

Having established the average number of miles a given set of cells connected in simple series would yield, it was decided to determine the effect of connecting the cells in series multiple. The method of carrying out the experiment was as follows: Eight new cells of the same make, showing by an ammeter 24 to 28 amperes, were placed in the battery box. The connections were changed as follows (see above figure): The wire ab conecting cell No. 8 and the coil was disconnected from the coil and attached to the zinc pole of cell No. 1. This pole now held the two wires ab and ef. The wire cd was disconnected from the switch

and connected to the carbon pole of cell No. 4. This pole now held the two wires cd and gh.

The effects were marked; the first one noticed was that the engine started more easily. But the most gratifying result obtained was that the car was driven for three months, with the exception of four days, without a single suggestion of anything like battery trouble. After the first day or two the question of battery trouble occupied a no more prominent place in the driver's mind than did the spokes of the wheels. It is a great comfort to the average owner to have at least one source of annovance eliminated. After running three months, the next day two missed explosions were noted. On the following day, after having driven 60 miles, the misses became more frequent and pronounced. The cells were then examined with an ammeter. Three of them read o; five of them 2. The mileage obtained was 1.756, a result nearly one and a half times better than the average obtained by using the same number of cells in simple series in two batteries. On this basis the cost of ignition per mile was a fraction over one mill.

### Italian Motor Truck Contest.

A national competition for motor trucks is being organized by the Italian Ministry of War, which plans to acquire 600 motor trucks at a total expenditure of 6,000.000 lire. In the announcement entries are requested of two types, one of 2,200 to 2,600 pounds useful load, and another of 4.400 to 5,500 pounds useful load. The trucks must be equipped with four cylinder vertical motors, capable of being operated with either gasoline or alcohol, be equipped with iron tires, four brakes and a front gasoline tank of a capacity sufficient for 125 miles. at an average of 9.5 miles per hour. The vehicles entered will be subjected to practical fuel economy and endurance tests, the strength of the material used in their construction will be determined by laboratory tests, and in addition the vehicles must take part in an uninterrupted run of 500 miles. Prizes to the amount of 20,000 lire will be awarded to competing manufacturers whose vehicles are not purchased at the conclusion of the trial, but who, nevertheless. are considered deserving of encouragement

The eighth international automobile show in Vienna, Austria, under the joint auspices of the Austrian A. C., the Austrian Automobile Manufacturers' Association and the Association of Austrian Automobile Dealers, will be held in the rotunda of the Prater from May to October, 1910, in connection with the first international hunting exhibition.

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### Stresses in Shaft Drive Members.

A most interesting series of experiments is described in our leading article this week, by S. Gerster. It has relation to the stresses in the transmission members of chain and shaft driven cars due to the play of the chassis springs. It will be remembered that this subject was discussed theoretically in our columns by Mr. Gerster about a year ago. Some of the conclusions then reached were placed in doubt by one or two of our correspondents, and it was evidently with the intention of verifying the doubtful points that these experiments were undertaken.

So far as the experiments with the universal joints are concerned they do not demonstrate anything that is not already known to designers and engineers. The fluctuations in velocity due to the angularity of shafts connected by the ordinary types of universal joints are subject to exact calculation, and it is known that these fluctuations can be neutralized by

using two joints and placing the forks on the intermediate shaft in the same plane; it is further well known that the effects due to this cause can be minimized by making the propeller shaft as long as possible and so arranging the engine and gear box on the frame that when the car carries an average load the shafts connected by the universal joint or joints are substantially in a straight line.

The part of the experiments which covers a hitherto more or less unexplored field, at least as far as matter having appeared in the technical press enables one to judge, is that relating to motion of the drive members produced by the compression and rebound of the springs. In a perfect design there should be absolute independence between the spring action and the drive members, in which case the spring action would not be checked or hampered by the inertia of the drive members and the drive members would not be subjected to strains due to the inertia of the chassis and body. Mr. Gerster's experiments prove that when the vehicle body approaches the axle in passing over an obstacle the propeller shaft is rotated through a certain angle, if the rear wheels are considered stationary. In other words, there is relative motion between the propeller shaft and the rear axle shafts. With most of the systems of linkages ordinarily employed the propeller shaft is turned backward through a considerable angle when the chassis springs compress 6 inches. In regular running on the road this would mean that the engine would be slowed considerably. This rapid slowing of the engine is resisted by the inertia of the flywheel. Instead of the engine slowing the car might accelerate in its forward motion, but this acceleration is resisted by the inertia of the whole car.

We have, therefore, a triangular system of forces which at any moment balance each other—the vertical force due to the inertia of the spring supported body and frame, and the two turning efforts or torques due to the inertia of the flywheel and other rotating parts, and of the whole car in the forward direction, respectively. It is obvious that these forces impose great strains on all of the transmission members, and they explain the frequent breakages of differential gears and other parts of the drive on some heavy vehicles.

From the photographs accompanying Mr. Gerster's article it will be seen that of the systems experimented with two give almost ideal results in this respect. In one there

is no other connection between the rear axle and the frame than the semi-elliptic springs, which are hinged to the frame at their front end, at an equal distance from the rear axle as the forward universal joint. The other and most meritorious system (in this respect) of all comprises both a torsion rod and a pair of distance rods. The torsion rod is evidently hinged to a bracket extending from the rear axle housing vertically upward, and connects to a cross member of the frame at some distance to the rear of the forward universal joint. The distance rods are connected to the rear axle and to brackets depending from the side frames, about even with the forward universal joints.

As in this system both the rear axle torsion and the forward thrust are fully provided for, it seems to be the ideal system of rear axle linkage, and we commend it to the attention of automobile designers.

### The Torpedo Body.

From the reports of the Olympia show and the activity among American makers it is evident that the "torpedo body" will be one of the most popular new types during the coming season. For the past two years there has been a tendency away from the large tonneau, and while it is still a popular standard type and is sold in large numbers, bodies in which both front and rear seats are set rather low, and are of substantially the same height, have advanced in popularity. According to the style of construction these have been variously termed "baby tonneaus," "pony tonneaus," "roadsters," "surreys," "close coupled bodies," etc. Of these names the term "close coupled" is perhaps the most distinctive, for it is the bringing of the rear seat close to the front one which characterizes the

In most of the torpedo bodies the seat arrangement is much the same as in those just mentioned. Their special feature is that the foot spaces for both seats are closed by doors and that these doors are brought up nearly to the height of the dash and the seat backs. This enclosing of the foot space appears to be a very sensible feature, for it protects the occupants from dust and from cold winds and allows of comfortable driving without a lap robe much later in the season than is possible with more open types of bodies.

Quite a number of these bodies have considerable carrying space at the rear, large compartments being provided under and back of the rear seat. If not carried to extremes this would seem to be a move in the right direction, for up to the present time most body designers have given too little attention to the carrying of luggage.

The torpedo style of body appears to lend itself readily to unusual and extreme designs, so no doubt many "freakish" constructions will be produced along with numerous sensible models, but it would appear that the general effect of its introduction should be decidedly beneficial.

### The Economical Small Car.

Among recent improvements in the design of small four cylinder cars perhaps one of the most important is the general decrease in fuel consumption. The small car of the present day is far more economical than that of a few seasons ago. At the present time there are some makes of small cars which average not far from twenty-five miles per gallon of gasoline in the hands of the average user. While the economy records established in fuel consumption contests have been far better than this for some years past, the performance of the cars in the hands of the average owner has not been at all comparable with their possibilities, and recent advances have been along the lines of improving the average rather than the best economy.

The increased efficiency which we have just noted is probably due to three causes. The first and most direct cause is the improvement in carburetor design and charge distribution. Modern carburetors give a pretty economical mixture under a much wider range of operating conditions than those manufactured a short time ago. A good deal of attention has recently been paid to evaporating the fuel more completely than was formerly customary, and no doubt this has had its effect in increasing the economy. Charge distribution is much more uniform than it was in the older motors, and the resultant more even production of power has no doubt had its effect in reducing the fuel consumption.

Very likely a part of the increase in economy is due to improvements in ignition apparatus. In the hands of the average user, at least, the magneto seems to be the most reliable means for producing uniform rignition. The spark timing seems to be right a greater part of the time than with any other method and in consequence the parts of the motor function more nearly in synchronism when magneto ignition is

used. Correct timing and proper spark values aid in getting the maximum possible horse power hours from a given quantity of fuel, so no doubt the fuel economy with a magneto as the source of the ignition current averages better than where batteries are used, since the latter are often used to the point of exhaustion. Very likely some of the single spark systems may compare favorably with magnetos in this respect, but they have not been so commonly used on the smaller cars up to the present time.

Undoubtedly the third important reason for the decreased fuel consumption which we have mentioned is the improvement in mechanical efficiency. Driving gears are much more carefully cut and more correctly mounted than formerly. The same may be said of change gears, though it applies here perhaps in a lesser degree. There have been great improvements in the design and workmanship of some of the most popular anti-friction bearings recently, and they are now usually mounted so that they work to good advantage. In the engines themselves better workmanship is apparent throughout. Pistons and cylinders are more accurate, and the rings are more correctly fitted; valves are made of better material and their seats are more uniformly jacketed-all of which tends to reduce leakage and to conserve the fuel.

Wheels are larger, and in all probability tires are more efficient than a season or two ago. Most certainly springs are made of better material and are more correctly designed so that they hold the driving wheels in more uniform contact with the road. There is little doubt that the weight is distributed to better advantage, that skidding has been lessened, and that traction has become more effective.

In short, we may say that cars use less fuel because they are made better and their parts work more harmoniously.

# An Improvement in Storm Protection.

Most automobile owners have suffered the very unpleasant experience of having to attach the storm curtains upon the commencement of a sudden rainstorm while on the road. As the curtains are arranged to be secured to the outside of the top frame and bows, by means of a large number of fasteners, the person who attaches them must stand without the protection of the top and is almost certain to be thoroughly drenched before he has accomplished the work.

An ingenious and enterprising owner has departed from the long standing tradition of the carriage industry by devising a set of storm curtains which are attached to fasteners upon the inside of the framing of the top, and which can thus be put in place without the necessity of anyone's leaving the shelter of the top. The curtains are attached in front to the inside of the regular type of glass wind shield which meets the front of the top, no storm front of the regular type being used.

Unless there is some objection to this new arrangement, which is not apparent on the surface, it seems to possess decided merit from the common sense standpoint, and it will be interesting to note whether top makers will adopt the idea as a general practice.

Certain it is that, as ordinarily provided for, the attaching of the side curtains, in an emergency, usually results in at least one of the occupants of the car being put into that condition of wetness from which it is the function of the curtains to protect him.

### Quiet Cars Now Common.

Cars which are practically noiseless in operation have become common enough so that they do not attract the attention they did a few seasons ago. Indeed, a machine which is unusually noisy will not sell in this country at the present time, no matter what its merits may be.

While uniformity of workmanship and adjustment of parts are responsible for much of the reduction of noise proper, muffling of the engine is by far the most important cause. Good mufflers which break up the sound waves and do not rise from the vibrations of the exhaust are now common. Then, too, the work of the muffler is much less than formerly, for individual cylinders are smaller and there are more of them. Also, the exhausts from all the cylinders are nearly uniform, and hence are not apt to set up unpleasant pulsations. This is fully demonstrated by the fact that some cars can be run with the muffler cut-out open with scarcely audible exhaust when the throttle is nearly closed. This effect can only be produced with a carburetor working nicely and the ignition in perfect condition. And it is evident that when these conditions are realized the charges must be very small and uniform to produce a flow of exhaust gates which is free from the sharp puffs which make the exhaust noise unpleasant,

# The Commercial Vehicle Trials of the Automobile Club of France.

By P. Maisonneuve.

The serious setback experienced by the French automobile industry about two years ago had at least one happy counter effect for the commercial vehicle, which had until then been neglected by the manufacturers. As the sale of cars de luxe decreased the great factories were obliged to turn their attention in the direction of utility vehicles—light cars low in first cost and in up-keep on the one hand, and vehicles for the commercial transportation of passengers and goods on the other.

No time was to be lost in making up the lead gained by foreign manufacturers. At that time there already existed in England, the United States and Germany well built commercial vehicles for which there were plenty of purchasers in these countries, while in France these same vehicles were only very few in number, and they generally consisted of stock touring chasses slightly strengthened for the special purpose, and equipped with either an omnibus or a truck body.

As long as the manufacturers were fully occupied in supplying the demand for vehicles de luxe from wealthy clients they were not inclined to devote part of their energies and means of production to the construction of a type of vehicle the sale of which was certainly less remunerative than that of touring cars. The above explains why the French manufacturers of commercial vehicles in 1907 were outdistanced by their foreign competitors. At that time there was in France hardly a single firm which manufactured commercial vehicles exclusively, and, besides, as already stated, the

sale of these cars involved great difficul-

It should also be stated that French merchants and manufacturers have always been very reluctant to adopt motor propulsion. Consequently, when the French manufacturers built "heavy prospective customers whom premature trials with crude vehicles had rendered skeptical with regard to the future of automobile traffic in commercial enterprises.

In the subsequent development of the commercial vehicle in France no attempt



THREE PANHARDS ON THE ST. CYR ROAD.

weights" what they had to contend with most was not so much foreign compettion—there was not then, and there are not even now a half dozen commercial motor vehicles of foreign manufacture in use in French territory!—but the doubts and lack of enterprise of their

was made to introduce all the different types of commercial vehicles in existence elsewhere, notably the enormous vehicles of the locomotive type which are so extensively used in Great Britain. The only type of steam commercial vehicle which has held its own in France up to the present is the Purrey system, exploited in Bordeaux, in which coke is used as fuel. These vehicles, however, are far from being of the same weight and massive appearance as the English vehicles referred to above. Even the large "heavy weights," carrying from 5 to 6 tons, and which are of sufficient strength and rigidity, are of the general appearance of automobiles and not road locomotives; there are very few tractors with trailers in use.

The above observations concerning the status of the French commercial vehicle industry are of particular interest for the reason that during the past two years great progress has been made in this line. If even as late as last year the commercial vehicle was at a dangerous turn in its history, it may now be truly said that this critical point has been happily passed. This is the conclusion which may be drawn from the contest recently conducted by the Automobile Club of France, with the co-operation of the French Minister of War.

This contest, which lasted for a whole



VINOT AND DEGUINGAND TRUCK.

month, from October 15 to November 15, comprised twenty-four stages of an average length of 100, 120 and 150 kilometres, respectively, according to the class of the vehicles, which stages had to be covered at the average speeds indicated in following table, which contains also principal data regarding the contest:

ter of War were required to go through four stages in the form of a convoy, that is to say, by following one another at short distances, two of these stages being covered without load and two with

at the average speeds indicated in t following table, which contains also t principal data regarding the contest:	he o					
		ige Speeds.—	Length of Daily Stage.	Maximum Load on One Axle.		
Class. Load Capacity.	Min.	Max.	Miles.	Pounds.		
I- 880-1,320 pounds	9.5	15.5	94.0	****		
II-1,322-2,640 pounds	7.5	15.5	94.0	2000		
III-2,642-4,400 pounds	7.5	15.5	94.0	****		
IV-4,402-6,600 pounds	7.5	15.5	75.0	8,800		
V-More than 6,600 pounds	5.6	9-4	62.5	11,000		
VI-Tractor-trucks		9-4	62.5	11,000		
IX—Six to ten passengers		75.5	04.0			

15.5

15.5

In the sixth class there was only a fuel consumption contests on the useful single entry, a Saurer 30 horse power tractor truck, with trailer.

X-Eleven to twenty passengers......

IX-Six to ten passengers..... 9.5

XI-More than twenty passengers, not represented in contest.

The twenty-four stages of the contest comprised seventeen circuits, with Verton mile basis (by taking account of the time required for the run). Both the passenger vehicles and the goods vehicles took part in these tests, and the results

94.0

94.0

8,800

in limited number, and stamped before the start of the trial.

In case of magneto ignition-One magneto and chain if necessary.

In case of battery ignition-One coil and four cells of two volts each.

In case of magneto and coil ignition One magneto and one coil. In case of mag neto and battery ignition-One magnet and its chain or one coil and four cells o two volts each

One front spring and one rear spring; on set of brakes, one chain for chain drives ve hicles; one universal joint for shaft drive vehicles; one front and one rear shock a sorber. For steam vehicles, one comple burner and one boiler tube.

The replacement of other parts was for bidden, and entailed disqualification. Amon other parts, the same wheels and tires ha to be used throughout the trials.

A total of 57 vehicles started in the co test, of which 8 took part in the military contest only; 32 took part in this contest and in that of the Automobile Club of



SAURER TRUCK, WINNER OF CLASS IV.

sailles as starting and finishing point, and seven other stages, which together formed a closed circuit, the itinerary being as follows: Versailles, Montargis, Bourges, Montluçon, Clermont-Ferrand, Moulins, Cosmes, Pithiviers, Versailles. The total distance of the different stages amounted to 1,510, 1,850 and 2,245 miles, respectively, giving an average of 62.5, 75 and 94 miles per day for the different groups.

During the first thirteen stages the vehicles were supplied with gasoline, during the following five with an alcohol mixture, and during the remaining six with benzol. The object of this provision was to demonstrate that commercial vehicles may be operated with these different fuels, and particularly as well with alcohol and benzol-national products-as with gasoline-a foreign product. This is a matter of particular importance in connection with military transportation in times of war.

The vehicles which participated in the military competition for the award of special bonuses and of orders by the Minis-

were worked out according to the following formula:

$$\frac{T}{P}(C+C'+KP'),$$

in which T is the time in minutes; C, the cost of fuel consumed per kilometer in francs; C', the cost of the oil used during the entire run in francs per kilometer; K, a coefficient of tire maintenance in francs, which is equal to 0.005 for iron or steel tires, 0.015 for solid rubber tires and 0.03 for pneumatic tires. In the case of vehicles equipped with different forms of tires on the front and rear wheels, respectively, a combination tire cost figure was worked, based on the weight on each axle; P is the useful load in metric tons, including the body; P', the total weight of the vehicle in metric tons.

What added to the importance and value of the trials was the very strict limitation of the replacements permitted. Aside from spark plugs, valves, springs and parts of carburetors, which could be replaced at will, the following parts were not allowed to be replaced except by parts of the same nature

France, and 17 took part in the latter con test only. Owing to the fact that the results of the military contest have not yo been announced at the time of writing, w will only consider the vehicles which too part in the contest of the Austmobile On of which 29 out of 49 finished and we officially classed.

Owing to the severity of the contest, the many failures are not surprising; on t contrary, it is remarkable that so many v hicles finished the trials. On the who there were very few mechanical troob during the trials. The majority of the v hicles which withdrew from the compe tion suffered considerable delays which pr vented them from checking in on time the night controls. Among the serious m haps which caused some of the vehicles discontinue may be mentioned the seiri of the motor of a Panhard; collisions which incapacitated two Berliet cars and white were due to broken brakes, and a lun which carried a Malicet & Blin off of the road. Toward the end of the contest to Schneider vehicles, three Delaugere & Cla ette, another Panhard, a Cohendet and a D

suffered other mechanical troubles caused their disqualification.

ny of the disqualified vehicles nevers continued to run in the contest unlly, with the object of showing that ole mishap had been the cause of their lification.

the conclusion of the trials the vehivere still in excellent condition and fit ontinue in equally difficult service. ng could better show the progress acished since last year, when at the end less severe contest many of the best es presented a wornout appearance, sagged axles and deformed wheels.

modern "heavy weights" are well def vehicles and conscientiously built for ard service for which they are intend-A simple example will give an idea of normous strains to which is subjected icle in passenger transportation in our ties. One of the Parisian motor buses s approximately 25,000 miles per year I to the circumference of the earth), rted and stopped 400 times per day, has the gear changed 700 times-it be impossible to count the number ake applications.

the opinion of many engineers the reuel consumption trials gave rather too values. The majority of the conits preferred to sacrifice fuel economy eed, the latter factor having a higher cient in the formula, and it was adgeous to approach as closely as possithe maximum average speed. Howsome of the manufacturers were careot to deviate too far from normal seronditions, and attempted to reduce the consumption. Iet us take the vehicle achieved the best economy results. fuel consumption of this vehicle per ton kilometer, that is to say the figure ned by dividing the total fuel consumed first by the number of kilometers run gh, then by its weight in tons, figured o 0.046 litre of gasoline, 0.042 litre ol and 0.039 litre benzol. These figare about the same as those obtained ear, yet it may be said that they reprein improvement, because, as mentioned report of the technical committee of Sutomobile Club of France last year, a single fuel economy test was made, his under particularly favorable road tions. This year average figures were ned, the results of a number of differests made on specially hilly roads, inng the very difficult route from Montto Clermont-Ferrand. The fuel contion tests of last year bore the same on to those of this year as a laboratest to a commercial trial, and as the s are identical it is obvious that proghas been made. The speeds obtained g the fuel consumption test were subally higher than last year. Thus, the les carrying loads of 3 tons accomd average speeds of 12.5 to 15.5 miles our, while in 1908 the speeds for the

class were between 9.5 and 12.5 miles our. This increase in the average



ARIES TRUCK.

speeds was undoubtedly due to the importance given the factor of speed in the for-

The results of the contest were as fol-

Class I, 880-1,300 pound delivery wagons-No. 44, Bayard A. Clement, first.

Class II, 1,322-2,640 pound trucks-

No. 58, Vinot-Deguingand, first.

Class III, 2,642-4,400 pound trucks-

No. 23, Saurer, first. No. 45, Bayard A. Clement, second.

No. 28, Delaugere-Clayette, third.

Class IV, 4,402-6,600 pound trucks-

No. 25, Saurer, first. No. 6, Delahaye, second. No. 24, Saurer, third.

No. 31, Vinot-Deguingand, fourth.

5, Delahaye, fifth. No.

No. 32, Vinot-Deguingand, sixth,

No. 19. De Dion Bouton, seventh.

No. 9, Aries, eighth. No. 38, Panhard-Levassor, ninth.

No. 35, Peugeot, tenth.

No. 56, Malicet & Blin, eleventh,

No. 52, Cohendet, twelfth.

Class V, trucks of more than 6,600 pounds' capacity

No. 8, Delahaye, first.

No. 7, Delahaye, second. No. 22, De Dion-Bouton, third.

No. 21, De Dion-Bouton, fourth.

No. 11, Aries, fifth. No. 12, Aries, sixth.

No. 57, Malicet & Blin, seventh,

Class VI, combined tractors and trucks-

No. 26, Saurer, first.

Class I, six to ten passenger omnibuses-No. 47, Bayard A. Clement, first.

No. 46, Bayard A. Clement, second.

No. 36, Peugeot, third.

Class X, twelve to twenty passenger omnibuses-

No. 27. Saurer, first,

In the contest of small vehicles, under the auspices of L'Auto, which is being held December 5 to 19, thirty-three cars are taking part. The contest consists of daily stages of about 125 miles, which must be covered without mechanical breakdowns, at an average speed of at least 15.6 miles per hour.

Owing to the fact that the Grand Prix race will not be held next year, the Benz firm has abrogated its contract with Duray, the well known racing driver, who has been engaged by the Fiat firm to drive for them in the leading Italian race of the year. Benz & Cie. have, however, secured Scisc, who in 1907 won the Grand Prix in a Renault car.



DELAHAYE THREE TON TRUCK, WINNER IN CLASS V.

# GREAT QUESTIONS OF AUTOMOBILE ENGINEERING.

### Chain Drive versus Shaft Drive.

BY ALBERT L. CLOUGH.

The question of chain drive versus shaft drive possesses far less general interest than it did a few years ago, for the reason that among low and medium powered cars of modern design very few models are offered which employ chain driving. However, manufacturers of high powered machines have been rather reluctant to depart from the double chain method of final drive, quite a number still adhere to it, and some few give their customers their choice of chains or shaft when purchasing high powered models. In quite a number of instances a manufacturer produces a high powered chain driven model and a shaft driven model of lower horse power.

The use of the single chain drive upon late models is so restricted that comparatively little interest now attaches to it. The present discussion relates to the double chain drive.

### ADVANTAGES OF CHAIN DRIVE.

Among the arguments in favor of this method may be mentioned the following: That the use of double chains permits the employment of the simplest form of fixed or "dead" rear axle, differing not at all in principle from the common wagon axle. The axle is merely a solid forging of the I beam or other structurally advantageous form, and not a tubular construction with internal shafts, gears and their housings incorporated therewith. The rear wheels are simply journaled on the axle ends. This simple axle may readily be so formed that the rear wheels are given the degree of camber which carriage practice has shown to be desirable. Such an axle is of relatively light weight, since it can be made of a cross section which gives greatest strength per unit of weight; it has no differential and driving gears to carry at its weakest point-the centre-and does not have a portion of the weight of any driving shaft and housing to support. Not having any casing or enlarged portion at its centre, road clearance is not sacrificed.

The elimination from the axle of all metal other than that necessary to support the vehicle itself upon its wheels greatly reduces its dead weight and results in a decided reduction of the uncushioned shocks delivered to the tires. Since the axle is so light it possesses a relatively low inertia, and, at very high speeds, its wheels follow road irregularities better than the more massive shaft driven construction, thus conducing to better traction, less tire slip and better car control.

The somewhat delicate differential gear being eliminated from the axle, where it is subjected to shocks cushioned only by the tires, is housed in the change gear case, where it is spring supported and better protected from the hard treatment of the road surface. Since the axle has no tendency to turn under power, no torque rods are required and no driving stresses are imposed upon the springs, the only special attachments to the axle required being two simple distance rods.

It is further claimed that the variations of angular velocity between the transmission and the rear wheels, due to rear spring action, are less in the chain than in the shaft drive with single universal, and that, as the chains afford a much less rigid coupling between the gear box and the wheels than does the shaft drive, the evil effects due to this cause are much less pronounced, and also that this slightly vielding coupling has an influence in reducing tire wear due to That universal joints between the gear box and the rear axle, which are called upon to work through considerable angular movements, and which require considerable attention, are entirely dispensed with. That it is very much easier to change the gear ratio of a chain driven than a shaft driven car by simply putting on front sprockets of different size. That the chain drive very readily permits of a gear box arrangement affording two direct driven speeds, which can only be secured in the shaft drive arrangement in case the gear box be mounted upon the rear axle. That double chain driving permits a rearward location of the gear box, and thus favors better weight distribution than does the shaft drive system, for the jackshaft may itself be located well to the rear and the rest of the gear box may, if desired, be located to the rear of the

It is also pointed out that the chain is a very simple and rugged device, the links of which are detachable and interchangeable, so that it can be readily repaired, if necessary, upon the road without the use of special tools, and without disassembling any parts of the car, while a breakage of any part of the shaft driving system is reparable only in the shop and requires extensive disassembling and costly replacements.

The advocates of chain driving call attention to the fact that, by the use of chain cases, this method of final drive is accorded several advantages which it does not otherwise possess, namely: That the chains are as fully housed as are the parts of a shaft drive, dust is excluded and the chains wear very slowly, get out of pitch only after long periods of service, and retain for a long time their initial efficiency, which is at least as high as that of bevel gears. That the chain case permits of the maintenance of lubrication which greatly reduces wear, and that, if properly constructed, it confines what little noise is produced. That encasing permits the substitution for the naturally rather noisy roller chain of silent

chains of the Renold or Morse type, which are characterized by high transmission efficiency and low rate of wear, if protected from dirt.

DISADVANTAGES OF CHAIN DRIVE.

Among the disadvantages cited against chain driving may be mentioned the following: That it is a less direct method of final drive than is shaft driving when applied to the engine in front motor car, for a bevel pair is required in the gear box to change the direction of the drive from longitudinal to transverse of the car length. Thus when running on direct drive the motor of a chain driven car is transmitting through a berd pair a divided cross shaft, with two flexible joints and a pair of sprockets and chain on each side, while the motor of the shaft driven car is transmitting only through one or two universal joints, with their connecting shaft and a single bevel pair. It is contended that the more direct the transmission the more efficient it is, under similar conditions

That unless chain cases are employedand they are not yet in general use-it is impracticable to employ chains of the silent type, and that the drive is thus quite noisy and increasingly so as the chains wear out of pitch. That it is well nigh impossible effectually to lubricate exposed chains, and that hence wear is quite rapid; they lose their correct pitch, and besides becoming very noisy are likely to ride the sprockets. break themselves and cause damage to other parts. That the expense of chain renewals is decidedly large, even though frequent cleaning and lubrication are practiced at considerable expenditure of time and effort. That the chain operates inefficiently over rough roads, which cause one rear wheel at times to be lower or higher than the other, on account of the front and rear sprockets being thereby thrown out of the same plane, with the attendant friction of the sides of the links against the sides of the sprocket teeth. That the use of side chains unfavorably restricts the design of bodies of the side entrance type and require the ux of front sprocket guards.

### ADVANTAGES OF SHAFT DRIVE.

The argument for the shaft drive includes the following points: That it is essentially clean and requires very little attention, there being no exposed parts and all moving elements being constantly subject to effective lubrication. That it may be made almost completely silent and will remain so almost indefinitely. That by the use of two universal joints the variations in angular velocity between motor and wheels, due to spring action, may be reduced below that found in the chain drive, and thus less obnormal stresses will be thrown upon the change speed gears. That by the use of a yielding member, embodying springs located

somewhere in the power shaft line, the somewhat ameliorated rigidity of drive which the chain affords may be duplicated. That the shaft drive maintains for long periods of use its initial efficiency, on account of the effective enclosure and lubrication of the working parts. That it is the most direct method of coupling the gear box to the rear wheels, and calls for no extra parts in the gear box. That it is entirely under the car and does not hamper body design.

The critics of the shaft drive contend: That the live rear axle which its use entails is more complicated and less structurally desirable. That, except in some special designs, the axle proper must be of tubular section, which is not the most advantageous form for strength with minimum weight. That the differential gear is unnecessarily exposed to road shocks by being incorporated in the axle. (These objections apply to all live axles, however driven.)

It is contended, further, that in order to secure a nearly straight line drive the gear box has to be placed unduly far forward. which results in an unfavorable weight distribution, and that the large unsprung weight of the axle, shafts, differential gear, drive gears and their housings, and a part of the drive shaft and its casing, acts to unduly increase tire wear, and calls for heavy construction to insure a proper degree of rigidty. That the rigid driving effect which it affords is unnecessarily hard upon the tires, and that at high speed the shaft driven axle does not hold the road very well on account of its high inertia. (This objection applies mainly at racing speeds.) That, as the rear axle tends to turn under the reaction of the driving effort, either a system of torque rods must be employed or the rear springs must be made to perform the double function of springing the vehicle and resisting the torque reaction. That the employment of universal joints, which is a necessity in this system, is wasteful of power and the joints themselves are subject to wear and demand considerable attention, and that rear wheel camber cannot be provided for in the shaft drive system without resort to special construction.

# Public Vehicles in Berlin-The Horse Passing Before the Motor.

The increase in the number of motor taxicabs has led to a decrease in the total number of public vehicles in service in Berlin during the third quarter of the year, from 10,702 to 10,552. The number of cabs has dropped from 6,475 to 6,308. Of the horse cabs of the first class, 224 discontinued, so that on September 30 there remained only 5,070. Cabs of the second class are disappearing slowly but surely; there were 129 left on September 30 against 132 on June 30. The number of motor cabs increased from 873 to 938. The omnibus companies owned at the end of the third quarter 953 vehicles, as compared with 942, of which 173 were motor propelled, as compared with 166.

# The Retail Business in Atlanta. By Charles E. Duryea.

Hindsight is more accurate than foresight, and the best view of Atlanta's retail business had to be waited for till the show, the races, the parades and the daily newspaper talk had passed into history and the temporary fever had cooled down. Atlanta's people seem more than usually impulsive and seemed to respond to the spirit of the occasion more fully than do the colder blooded inhabitants of the North. The space devoted by the daily papers to exploiting the automobile was great, but the enthusiasm thrown into the work was greater and was matched by the "Atlanta spirit" of the people, who seemed determined to make up by their responsiveness what they lacked in numbers. As a result of this good roads are being made at a rapid rate, and automobiles have been purchased very liberally, while even those whose finances do not at present permit auto ownership look forward to the day when they will be able to afford this necessity

Nor was this feeling confined to Atlanta alone. It extended beyond the 300 miles of good roads in Fulton County and covered the whole State, even reaching the sands of Florida. Buyers flocked to Atlanta because of its prominence as a distributing point, and the auto dealers prospered accordingly. Others saw this prosperity and yearned to share it. The result was the opening of salesrooms and garages on every hand until in that city of 120,000 people, probably half of whom are colored, are to be found at least seventy-five dealers, representing more than 120 different makes of autos. When it is remembered that the colored people are not buyers, that the country is relatively new, and has not the accumulated wealth found in the North, and that the majority of the roads are still bottomless beds of sand or badly gullied clay hills, it will be seen that the outlook for a continuation of the profitable business of the past season is not good. And the agents are awakening to this. When closely questioned they express the opinion that they will be kept busy selling the cars they have contracted for. They realize that the market is being overworked.

Recognizing the fact thus early, they will do much to avoid a slump and the throwing of cars on the market at ruinous prices. But in any event the danger is great. And it is made greater by the fact that in their enthusiasm the practical use of the auto was largely overshadowed by the sporting use. Demonstrations were given on the best roads, models of road making, instead of on average or on inferior roads, where practical users must go more or less frequently. A large number of Atlanta's streets are either not paved or are paved with stone blocks settled into a more or less rough and irregular surface, but prospective buyers and dealers taking a demonstration seemed not to care for those streets, but chose the better ones and put a premium on speed rather than on practicability.

The large number of modern rigs now in Atlanta present an unusual sequence of beautiful, speedy and nearly noiseless cars. real ornaments to the street and splendid advertisements for the business. But not all of these are pleasure vehicles, and the number of touring cars to be seen hauling lumber to a new building or junk from an old one is unusually large. The conclusion is that Atlanta is passing through the extravagant sporting period of her auto existence; that the past splendid sales records will show very decided falling off during the coming year, and that a demand for low geared, strongly constructed, practical rigs will grow and should be carefully fostered by the dealers. In connection with the latter clause is the surprising fact that there are no motor buggies offered for sale in Atlanta. The South, presumably their special field, seems not to be buying them for two reasons-one, the prominence given to the speedy conventional pleasure type, and the other the fact that such buggies as have been sold in Atlanta have been too heavy, too complicated and not properly built to give satisfaction over the rough stone streets and inferior roads. The absence of the cushioning air tire necessitates quality of workmanship and material, superiority of design and lightness of weight not usually sought for by buyers of these vehicles.

Because of Atlanta's moderate size and the clannishness of her people any word, good or bad, is quickly passed along, and this means that she will soon weed out the unfit and retain the fittest vehicles.

# Revision of French Rules of the Road.

The French Government nearly a year ago took preliminary steps looking to a revision of the present road regulations, which were first adopted some sixty years ago. Louis Barthou, Minister of Public Works, appointed a commission of experts, including motorists, road makers, cyclists, horse owners and the Ministers of Justice and Public Works, to draw up a code to be presented to the Government for adoption.

The experts met last June, and again in October. In the meantime they had gathered together, in a classified form, all the road regulations of all countries. From this mass of regulations they will pick out the best, and with them create an ideal set of laws governing traffic. Although the automobile men occupy a prominent position on the commission, the intention is to study the question from the standpoint of every class of road user, including the foot passenger, the horse owner, the automobilist and dwellers along the roadside. In addition the road builder will be consulted.

Another proposed improvement is that all cases of dispute between any stranger and a native shall not be tried before the local courts, but in the chief town of the department. It is rare, indeed, that the stranger receives fair treatment in a local court.

# A Sensation in Values in France.

Evidently inspired by the policy of several well known American manufacturers the firm of A. Darracq & Cie., of Suresnes, France, have recently brought out a four cylinder, four passenger car, which sells, with body complete, for 5,000 francs ( a trifle less than \$1,000). This practice of selling cars complete with body is a new departure for French manufacturers. It was formerly always held that in the selection of the body the customer should be allowed to exercise his own judgment, and his more or less developed artistic sense, guided and counseled by the body builder, but it seems that the conclusion was reached that the class to whom this thousand dollar car would appeal were not so fastidious. The price no doubt will look very low to French buyers, who only about two years ago regarded a small, low powered four cylinder chassis, without body, at 6,300 francs as very low priced. The American low priced cars imported into France sell, of course, at considerably higher prices there than here.

Although art is said to be cheap in France, it would perhaps be unreasonable to expect much of it in a car of this class, especially since the sensible engineer would aim to provide a maximum of material value. The lines of the new car are plain and severe. But in the chassis design nothing seems to have been unduly skimped. The several parts bought from parts makers, such as magnetos, frames, radiators, tires, are of the most reputable makes (Bosch, Arbel, Grouvelle and Michelin), and the several features of design, illustra-

ted in a description of the car in our French contemporary Omnia, are all well considered, apparently. The chassis is of exceptionally clean design, due in part to the use of an en bloc motor.

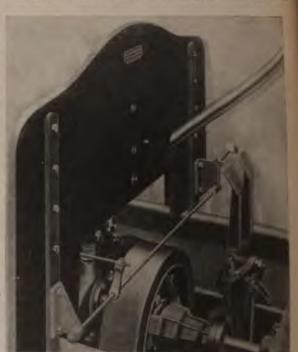
The motor has a bore of 85 mm, and a

stroke of 100 mm. (33/8x4 inches), and is claimed to give a maximum power of 19 horse power at 1,500 r. p. m. A special feature of the design is that all the accessories, including the high tension magneto, the carburetor. cooler fan, water pump and clutch, are secured to the motor, and upon taking out four large bolts, which secure the motor to the frame, the whole power unit can be removed together. The cylinders are all in one casting, which also contains the inlet and exhaust passages, so that outside manifolds are dispensed with. The crank shaft bearings are carried by the upper cast half of the crank casing, and lower half is made of sheet metal and contains a false bottom, below which there is an oil well.

The lubrication system of the motor is one of the most interesting features.

The oil in the oil well is replenished by pouring into the cup TT at the top of the vertical breather tube, which is closed by the cap R. The oil thus poured in flows into the reservoir H at the bottom of the crank chamber, which contains a wooden float B mounted on a counterweighted lever arm. As the level of the oil in the reser-

Q; which is connected to it. The toy mf of this rod projects through a central con ing in the breather tube cap, and its pojecting end is graduated, by which men the operator can instantly determine at in time how much oil there is in the reservice



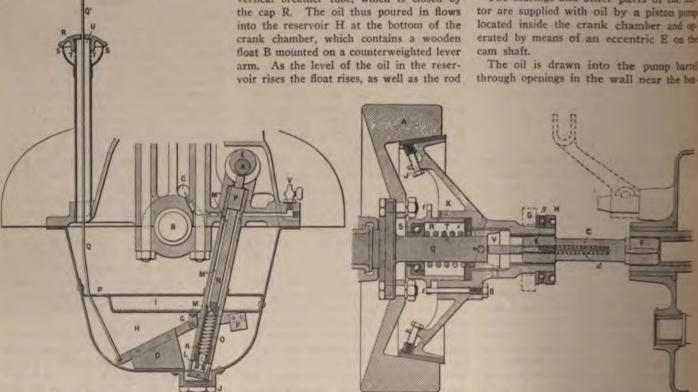
1910 MODEL 14-16 DARRACO.

Showing absolutely clean dashboard, details of clutch inlibrackets carrying pedals.

This oil gauge is also a convenience in filing the reservoir.

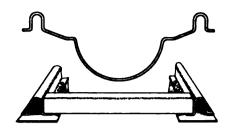
The bearings and other parts of the motor are supplied with oil by a piston pump located inside the crank chamber and or erated by means of an eccentric E on the

The oil is drawn into the pump barrel



DARRACO CRANK CASE CONSTRUCTION AND LUBRICATING SYSTEM.

DARRACO CLUTCH AND FLEXIBLE CONNECTION TO CHANGE GEAR



DARRACO COMBINED PRESSED STEEL FRAME AND UNDERSHIELD

tom; during the down stroke of the plunger it flows through the hollow piston and is forced out through openings in the cylinder wall near the top and through passages drilled in the crank case wall, being finally discharged through the opening C, whence it is projected over all the internal parts.

In addition to this oil circulating system a splash system is also provided. The oil thrown out of the opening C collects in a dip pan I, in which the connecting rod heads dip at each revolution. This dip pan is constantly kept filled with oil, and the excess overflows to the oil well through the opening P.

The clutch is of the regular conical leather faced type, and contains a number of spring pressed plungers for insuring gradual engagement. The male cone is carried on an extension of the crank shaft, and its hub is connected to the primary shaft of the change gear by means of a short shaft with square joints at both ends. The hub of the cone is threaded internally to receive an externally threaded cap which encloses the clutch spring. This spring bears against the collar pinned to the outer end of the crank shaft and against the inner race of a cup and cone ball bearing located in the top end of the cap above referred to. The construction is exceedingly simple.

To remove the clutch the operating lugs of the cap R must first be freed from the bolt B, after which the cap is unscrewed to the limit. The cone may then be moved sufficiently to the right so that by taking hold of the shaft C in the middle and pushing it to the left the head F is liberated and drops of itself. The cone slides on the collar V and may be completely removed.

### Electrics Burned in Transit.

A railway freight car containing a load of fourteen electric vehicles built by the Anderson Carriage Company, of Detroit, Mich., and consigned to a firm in San Francisco, was destroyed by fire at Maple Park, Ill., recently. When the freight train arrived at Maple Park the car was discovered to be burning, and was immediately uncoupled from the train and side tracked. The local fire department was called out and extinguished the flames after the car and contents had been almost completely destroyed.

### Book Reviews.

Two books of special value to beginners, or the ambitious journeyman who has not the advantage of an education in mechanical lines, have been recently issued by D. Van Nostrand Company, 21 Murray street, New York. The two go hand in hand, one being a complement to the other. The first book, "Mechanical Drawing for Trade Schools," is the work of Charles C. Leeds; it starts the student in at the very beginning of mechanical drawing and leads him on by easy stages through the various phases of the subject, the use of drawing instruments, the first easy steps in sketching, and gradually up to the more difficult subjects. The second book, written by Franklin E. Smith, is devoted to mathematics, and begins with numeration and notation, then takes up the many divisions of arithmetic in its simple forms, and leads up to the more complicated and difficult problems. The book deals with tables of weights and measures used by mechanics, signs and characters, mathematical formula, specific gravity, simple machines, strength of materials and questions relating to stress. Both books are written in simple language, which will be far more acceptable to the general student than the text book terms generally used.

Vehicles of the Air, by Victor Lougheed. Published by the Reilly & Britton Company, Chicago.

This is a comprehensive, popular treatise on the subject indicated by the title. The book contains 550 pages, 140 half tone illustrations, and many mechanical drawings and sketches. The photographic reproductions are on heavy coated paper, and particularly clear and distinct.

In the introduction the author deals with the possibilities and promises of aerial travel in the future. The first chapter of the book relates to the atmosphere, the element in which all aerial travel takes place. The author dwells upon the constitution and the various physical properties of atmospheric air. A second chapter relates to lighter than air machines, and the rest of the book is devoted to aeroplanes, the subject being treated historically, descriptively and analytically. A brief history of all of the men prominently connected with the development of flying machines is given, and the events in the aeronautic world during the past year are fully covered. The fine half tone illustrations of most of the recent successful flying machines and of their details are a particularly valuable feature of the book.

The United States Government has refused to pay to the Secretary of State of New York the Nicense fee of \$2 for license No. 75,541, issued to Major General Leonard Wood, on the ground that property of the Government cannot be taxed. Secretary of State Koenig held that the sum was a fee for a service and not a tax, but the Federal Government still refuses to pay.

# Sees an Opening for American Electric Vehicles in Europe.

Emil Gruenfeldt, chief engineer and designer of the Baker Motor Vehicle Company, has just returned from Europe, where he visited the automobile centres, and made a study particularly of the trend in electric vehicles. "The European electric," said Mr. Gruenfeldt, "is only manufactured in the heavy brougham and cab models, and there is a great demand abroad for the light, easily controlled electric runabout. The greatest objection to European electrics is the use of very thin plates in the batteries. which, while they give a greater mileage at the beginning, are so short lived that they are not practical. The series wound motor is becoming standard, and all of the later models are of the single motor type, with double speed reduction and shaft drive. The 'hub' motor built directly into the wheel, which has been so much discussed, is rapidly disappearing, owing to its inefficiency in starting and hill climbing, and the frequent necessity of repairs on account of the severe direct vibration of the wheel on the road.

The "drum" type controller is standard in all European electrics, and the electric brake and recharging points formerly used have been discarded. The whole tendency abroad is to simplify the electric, yet in this respect American designers have far surpassed the best efforts of foreign manufacturers. European electro-chemists experimented with alkali batteries for many years, but could not overcome the disadvantages of the great potential drop under overloads and their limited recuperative power, a fault which the late American batteries of this type still show. The pasted lead battery is the standard abroad.

"Solid tires and cushion tires have both been used abroad, especially for taxicabs, but on account of the heavy vibration of the car and the loosening and breaking of vital mechanical parts they have been practically discarded, and the late cars are equipped with pneumatic tires. Even electric trucks and buses are being equipped with pneumatic tires of the twin and triple type; that is, two or three individual tires side by side on the same wheel.

"For no other type of motor car are there greater opportunities in export business than the electric, and if American manufacturers will establish foreign agencies and push the sale of their cars abroad they are certain to obtain large orders. European cities are much more congested than those in this country, and American electrics are so much superior in design and efficiency to foreign cars that comparisons are odious."

Chauncey W. Hammond, formerly paymaster of the Everitt-Metzger-Flanders Company, Detroit, was held on December 10 under \$10,000 bail for trial on the charge of stealing \$17,000 from the company, by substituting two grips filled with bricks for two containing cash for the factory payroll

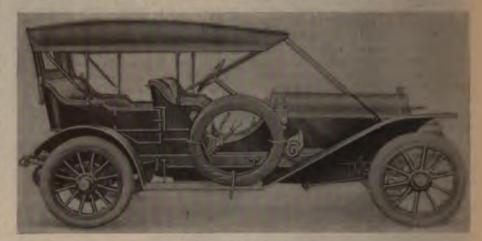
# DESCRIPTIONS OF NEW VEHICLES AND PARTS.

Palmer-Singer Models for 1910. The Palmer & Singer Manufacturing Company, of New York city, are listing two chassis models for the coming season, a "six-sixty" and a "four-thirty." The former, which is known as Model LXII, is equipped with either a five passenger baby tonneau, a gunboat or a racing body, the prices being \$3,500, \$3,900 and \$3,500, respectively; while the four-thirty, which is known as Model XXX, is provided with either a single rumble roadster, a five passenger baby tonneau, or an extension front landaulet body, and sells at \$2,250, \$2,500 and \$3,650, respectively. The town car chassis differs in a number of respects from the chassis for the roadster and baby tonnear cars.

The six cylinder, 60 horse power motor is of 43% inch bore and 51/2 inch stroke; it is claimed to give its rated horse power below 1,200 r. p. m., and to reach its maximum output at 1,600 r. p. m. All of the wearing parts are finished by grinding. The piston pins are hollow, and the connecting rods are nickel steel drop forgings. Antifriction metal bushings are used for the upper ends and bronze bushings for the lower ends. These valves are located on opposite sides; they are made of a special grade of heat resisting steel, and of 23% inches clear diameter. The valve stem guides are renewable. The cams are ground to size with the aid of a master cam, and the cam shaft gears are made with malleable iron spiders and bronze rims, which is claimed to greatly reduce the noise of these gears. The exhaust cam shaft carries small relief cams, which can be brought into action so as to hold the exhaust valves open during part of the compression stroke, by shifting the cam shaft endwise, thus relieving the compression and facilitating the work of cranking the motor. The push rods are provided with hardened and ground rollers at their lower ends and with adjusting screws with noiseless fibre inserts at the upper end. The crank case is east of aluminum, and all of the bearings are supported by the upper half, the lower half

acting only as an oil well and a dust protector.

Breather passages are cored in the arms of the crank case and covered with screen caps. These also serve for filling the crank chamber with oil. Enough oil is carried in the crank case to last for 300 miles, A gear pump draws oil from the reservoir below the crank case and delivers it to a pipe extending the entire length of the upwhich is claimed to render the motor extremely flexible. It contains the usual float chamber from which fuel is led to three nozzles, each in its own Venturi air tube One of these nozzles is provided with an adjusting needle, the movement of which is limited to less than a full turn, and the air passage around this nozzle is always open. The other two air passages are closed at the top by check valves, which are con-



P. & S. SIX CYLINDER CAR.

per case, from which copper tubes lead to the main bearings and to the cam shaft gears. The crank pins receive their lubricant through holes drilled in the crank shaft, through which passes the excess oil from the main bearings. The cylinders and cam shaft bearings are lubricated by splash. All of the oil drains back to the reservoir at the bottom of the crank chamber, and is filtered before it enters the pump again. A float in the oil reservoir, with a tell-tale extension visible in a glass tube in the upper half of the case, shows at a glance the amount of oil in the motor.

The crank shaft is made from a solid billet of hammered steel. The crank throws are sawed out, after which the shaft is heat treated and machined. The final finish of the bearings is by grinding.

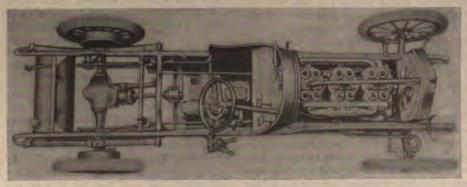
A triple nozzle carburetor is employed,

trolled by a cam acting in unison with the throttle valve, so that the check valves open successively as the throttle is opened. The cam adjustments are made at the factory, and proper nozzle sizes are provided, leaving only the slight needle valve adjustment by which the purchaser may compensate for variations in altitude, fuel or almospheric conditions. Warm air is drawn in, in order to insure proper vaporization of the gasoline.

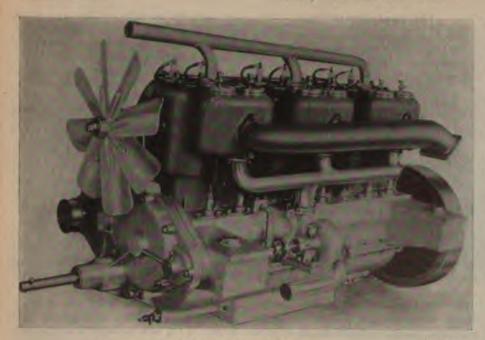
On most of the models the gasoline tank is located at the extreme rear of the chassis, where it can be filled without disturbing the passengers. The gasoline is forced to the carburetor by air pressure. The initial pressure is obtained by a hand pump located on the dash, and after the motor starts the pressure is automatically maintained by exhaust gases from one of the cylinders, which pass through a pressure regulating valve. The pressure required is 11/2 to 2 pounds, and is always indicated by a pressure gauge on the

All models are equipped with a Bosch high tension magneto, and all except the town car have in addition a battery ignition system, entirely independent of the magneto system, for starting. The high tension wires of both systems are carried through a metallic conduit on top of the cylinders, and the inlet and outlet openings of the conduit are provided with insulator bushings to prevent chafing of the rubber cable insulation.

The cooling water is circulated by a centrifugal pump, gear driven from one of the



PLAN OF CHASSIS.



SIX CYLINDER MOTOR.

cam shaft gears, through a honeycomb radiator mounted on trunnion supports. The brackets are fastened to the brass casing of the radiator, and are claimed to completely eliminate all torsional strain on the tubes. The water enters the jackets directly under the exhaust valves, and leaves at the top of the cylinders. A belt driven fan is mounted back of the radiator.

The 30 horse power motor is of 4½ inch bore by 4½ inch stroke. The cylinders are cast in pairs, and all of the valves are on the same side. The rated horse power is claimed to be delivered at about 1,250 r. p. m., while the motor delivers its maximum output at about 1,650 r. p. m. This motor is built along the same lines as the "six sixty," so that it is only necessary to point out the several differences. The lubrication system is exactly the same, and the

cooling system is also the same, with the exception that a fan spoked flywheel assists the radiator fan. The crank shaft bearings, carried by the upper half of the aluminum crank case, are bushed with die cast babbitt bushings, as are also the crank pin bearings. The piston pins are clamped tight in the upper ends of the connecting rods, and have their bearings in the piston bosses. The valves are all located on the right side, and the water pump and magneto are arranged on the left side, in line with each other and driven by a single gear, , with Oldham couplings between, so that one can be removed without disturbing the other. A Stromberg carburetor is used on this model.

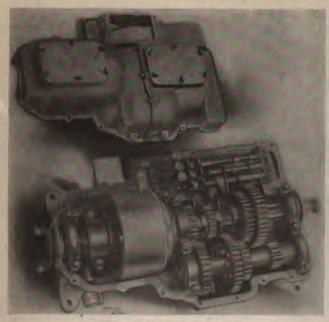
The change gears on all Palmer-Singer models afford four forward speeds and one reverse, the direct drive being obtained on the third forward speed. The gear set is operated selectively. The gears and pinions are made of alloy steel, case hardened, and have very wide faces; they are mounted on large shafts, which are carried in imported annular ball bearings. The clutch is a multiple disc device, running in an oil bath in the front end of the gear box.

The rear axle is of the full floating type, the driving shafts engaging the wheel hubs by means of jaw clutches. At the outer ends of the axle imported annular ball bearings are fitted, while on both sides of the differential and on the bevel pinion shaft four point adjustable ball bearings are used, these taking end thrust as well as radial loads. The differential is of the bevel type, and may readily be removed, together with the bevel gear, after taking off the cover and the bearing caps, and pulling the driving shafts out endwise through the wheel hubs.

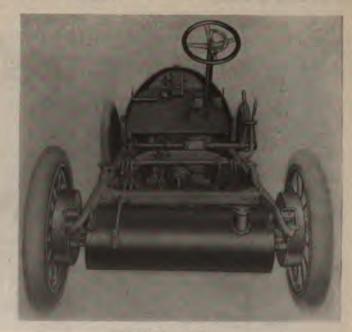
The propeller shaft is specially heat treated and provided with universal joints at both ends, which latter are protected by pressed steel casings and leather coverings, which are filled with grease. The torsional strains are taken up by a torsion rod rigidly secured to the axle near the centre and supported at its forward end upon a spring buffer. Adjustable radius rods carry the forward thrust of the axle to each side frame member, and maintain the rear axle at right angles to the frame.

There are two sets of brakes, both of the internal expanding type, and both acting on rear wheel drums, there being two sets of drums of different diameters. The larger diameter brake is the foot brake or service brake, and the smaller one the hand brake or emergency brake. The brake drums are of pressed steel, and the brake shoes have bronze wearing surfaces. The brake rods are provided with equalizers.

The front axle is an I section hand forging of nickel steel, provided with inverted



CHANGE GEAR.



REAR VIEW OF CHASSIS.

Elliott steering knuckles. These axles are sometimes referred to as of the Mercedes type. The front wheels are mounted on imported ball bearings, and are positively locked against coming off in case any of the balls should break. The steering tie rod consists of a nickel steel tube, and is placed back of the front axle. The forked joints of this rod have particularly liberal bearing surfaces. The steering gear consists of a semi-reversible worm and nut mechanism, which is provided with means for adjustment. The steering lever at the bottom of the gear is a drop forging, and the connecting rod, through which this latter is connected to one of the knuckles, has a universal joint, with large hardened pins and grease cup lubrication at each end, replacing the ball and socket joints used in many cars. The steering wheel is 18 inches in diameter, and comprises an aluminum spider and a wood rim. In addition to the usual control devices there are an accelerator pedal and a muffler cut-out pedal on the toeboard.

All of the springs are semi-elliptic, except the rear springs on the town car, which are three-quarter elliptic. The shackle bolts are provided with oil cups. The wheels have their spokes dished, and the front wheels are slightly cambered. The wheel base of the "Four-Thirty" roadster and baby tonneau is 115 inches, and that of the town car 120 inches. The tire equipment of both cars is 34x4 inches. The "Six-Sixty" has a wheel base of 127 inches, and the tire equipment is 36x4 inches front and 36x4½ inches in the rear.

### Racine Manufacturing Company Works Burned.

The plant of the Racine (Wis.) Manufacturing Company, manufacturers of auto tops, etc., was destroyed by a fire on Sunday, together with the Mitchell Wagon Works and several residences, the total loss amounting to \$650,000.

### The Continental "35."

This is one of the new medium priced cars of the season which has just been announced by the Indiana Motor Sales Company, of Indianapolis, general sales agents. The car is being manufactured by the Indiana Motor and Manufacturing Company, of Franklin, Ind. The price, with an equipment including a Remy magneto, five lamps, a Prest-O-Lite gas tank, horn, jack and tools, is \$1,400.

The four cylinder motor has a 43% inch bore and a 41/2 inch stroke, and the cylinders are offset three-quarters of an inch from the crank shaft centre. The crank shaft is carried in three bearings, all of which are supported from the upper half of the crank case. The lower half of the casing can be removed without disturbing the oiling system or the working parts of the motor. The cylinders are cast en bloc and are provided with large water spaces to facilitate the circulation of the water on the thermo-siphon principle. The valves are extra large, having a head diameter of 2 inches, and are of the combination electtrically welded type. The cams are integral with the cam shaft and are case hardened and ground, as are the bearings of the cam shaft. The valve lifters are of the mushroom type, and are provided with adjusting means and fibre inserts for silent operation.

A late model Schebler carburetor is used, which is supplied from a 15 gallon gasoline tank of oval shape. The Remy dual system of magneto and battery ignition is used, which comprises a Model S induction type magneto and a battery of six dry cells. The radiator is of the vertical tube, honeycomb effect type, and a fan is mounted on the motor back of the radiator.

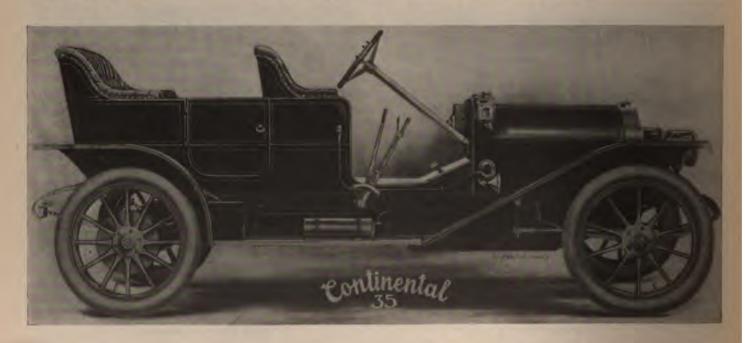
The clutch is of the multiple disc type, comprising sixty discs of high carbon steel running in oil. The clutch spring is adjustable. The change gear gives three forward speeds and one reverse, on the selective principle, and is carried on the rear axle.

All gears are cut from 3½ per cent. nickel steel and are heat treated. The shafts of the change gear are carried in Hess-Bright annular bearings exclusively. The drive to the rear axle is through a set of bevel gears, and the driving connection between the clutch and the gear set consists of a shaft enclosed in a tube, with a single universal joint at the forward end.

The rear axle is of the semi-floating type with New Departure combined thrust and radial load bearings at both sides of the differential, and Hyatt roller bearings in casings at the ends of the shafts. The front axle is an I section drop forging, with the spring pads forged integral. The steering knuckles are also drop forgings, and the spindles are fitted with Timken roller bearings. The steering tie rod is located back of the axle, and the steering rod runs fore and aft.

A worm and worm wheel type steering gear is employed. The stationary brass tube column of 134 inch diameter is surmounted by a 16 inch rubber covered steering wheel, and the spark and throttle control levers move over a stationary quadrant on top of the wheel. The spider of the steering wheel is of aluminum and polished. Two sets of brakes, internal expanding and external contracting, respectively, act on pressed steel brake drums 14 inches in diameter by 234 inches width of face, secured directly to the rear wheel hubs. The brake bands are faced with Thermoid. The emergency brakes are operated by means of a hand lever working in a notched quadrant, while the change gear is operated by means of a hand lever working in an H quadrant.

The frame is of pressed steel, the side members being 3½ inches deep and 1½ inches wide, and having a drop of 2½ inches a short distance forward of the rear axie. The motor is carried on a sub-frame. The frame is supported on 40x2 inch semi-elliptic front springs and 40x2 inch scroll end, full





AMERICAN ROADSTER.

elliptic rear springs. The spring shackles are provided with grease cups,

The car has a wheel base of 116 inches, and the weight is given as 2,000 pounds. The wheels are 34 inches in diameter and fitted with Goodyear quick detachable rims. Fisk tires are the regular equipment, but an option is given on a number of other makes. The dash is of mahogany with brass binders. An aluminum toeboard is provided, while the running boards are of wood and covered with an aluminum matting. The fenders are provided with aprons and heavy beading, and are rigidily supported to prevent rattling. The car is equipped with a five passenger touring car body, with tufted upholstering of machine buffed leather. The rear seats are 48 inches wide inside the upholstering.

### The American 1910 Models.

The American line for 1910—American Motor Car Company, Indianaoplis—consists of six models, known, respectively, as the Traveler, Traveler Special, Roadster, Roadster Special, Tourist and Limousine.

The motor in all except the Roadster Special and the Traveler Special is a four cylinder of the four cycle type, of 5½ inch bore by 5½ inch stroke, developing 50 horse power at 1,000 r. p. m. In the two specials a four cylinder motor of 5¼ inch bore by 5½ inch stroke is used, developing 60 horse power at 1,000 r. p. m. The cylinders in both motors are cast in pairs, and the water cooled by means of a gear driven centrifugal circulating pump.

In the smaller motor the valves are all on one side. In the two larger motors the inlet valves are inverted directly over the exhaust valves and operated by rocker arms, the cylinders being of the L head type. All models, with the exception of the Tourist and the Limousine, are built with the underslung frame chassis which has been a feature of cars of this make from the beginning.

Ignition is by the Bosch high tension dual system, with single unit coil, kick switch and storage battery, both systems operating through the same set of spark plugs. The float feed, auxiliary air valve carburetor is water jacketed and controlled from the dash.

The clutch is leather faced, of the fan bladed cone type. Four speeds forward and one reverse are provided on all models in the selective type transmission, with direct drive on the fourth speed. The drive is direct by shaft to the differential in the floating live rear axle. The front axle is a one piece forging of nickel steel, of I section.

Three models-the Traveler, the Traveler Special and the Roadster-are equipped with the 40 inch wheels popularized on the 1000 Traveler. The wheel bases are: Traveler and Traveler Special, 122 inches; Roadster and Roadster Special, 110 inches; Tourist and Limousine, 124 inches, Springs on all models except the tourist and limousine are semi-elliptic; on the two excepted models they are semi-elliptic in front and platform in the rear. The carrying capacities are: Traveler and Traveler Special, five (three in the rear with the tonneau door swinging forward); Roadster, three; Roadster Special, two; Tourist, seven; Limousine, seven.

### The Warner Anemometer.

To meet a demand that has grown up in connection with aeronautics, the Warner Instrument Company, of Beloit, Wis..

have brought out an anemometer which has been designed especially for use in connection with aeroplanes and aeronautics. It is designed and built on the well known principle of the autometer; in fact, is practically a Model F autometer inverted and provided with the usual anemometer spider and cups. The scale is of course especially calibrated. The instrument is very small, measuring only 171/2 inches from outside to outside of the cups, and weighing complete only 2 pounds. It is claimed to be thoroughly practical and perfectly accurate and to show wind velocity from zero to 60 miles an hour. It is designed to be attached to the frame of the aeroplane within sight of the driver, and in this position will accurately indicate its speed. The Warner Instrument Company have one of these anemometers in use in the Curtiss areoplane purchased last summer by Mr. Warner.

The seventh annual automobile show in Turin, Italy, will be held in the Fine Arts Palace in the Valentino Park, April 2 to 24, 1910. Following American practice the show management will provide all necessary decorations, which will be uniform. An exhibit of flying machines is to be combined with the show, as well as a division for agricultural and industrial applications of the automobile motor.





MERCER CAR.

### Mercer Cars.

Four types of cars on a standard chassis are being produced by the Mercer Automobile Company, of Trenton, N. J. These are a limousine, a five passenger touring car, a baby tonneau with running board seat, and a two passenger runabout, also with running board seat

The motor used is a 43% inch bore by 43% inch stroke Beaver, with valves all on one side, and the oiling system contained in the lower half of the crank case.

A multiple disc clutch is used, together with a three forward speed, selective transmission. The rear and front axles are made by the American Ball Bearing Company, the rear axle being a semi-floating, with pressed steel torque rod, and equipped with two radius rods to take the driving strains. The brakes are internal expanding and external contracting, both on the rear wheel drums, operated by the usual method of equalizers, lever and pedal.

The frame is cold pressed nickel steel. slightly inswept in front, with a drop at rear to get a lower centre of gravity. The steering gear is a worm and sector, with

CRANKLESS TIRE PUMP.

ball thrust washers above and below the worm, and eccentric bushes on the horizontal shaft for adjustment to take up lost motion in the 17 inch steering wheel.

The cooling system comprises a centrifugal pump, ball bearing, belt driven fan and a cellular radiator. The front springs are semi-elliptic, 40 inches long by 2 inches wide, and have seven leaves; the rear springs are three-quarter scroll elliptic, 51 inches long by 2 wide, and have eight leaves. The standard colors are Mercer brown for the baby tonneau and Packard blue, with ivory gear or maroon for the other cars. Cars come fully equipped with five lamps, tools, tire pump, jack, etc.

### A Crankless Tire Pump.

A very simple mechanically operated gear pump for inflating tires is manufactured by Audindau & Cie, of 41 Rue Ibry, Neuilly, France. As shown by the illustration, it consists of an air cooled cylinder, which is screwed into one of the spark plug holes of the motor, and the spark plug is screwed into a threaded hole in this fitting. Within the cylinder A there is a piston C, which is forced to the upper end of the cylinder when an explosion occurs in the motor cylinder. The air in the upper end of cylinder A is then forced through the delivery valve E and a hose secured to the cylinder by the coupling H to the tire which it is desired to inflate. During the next suction stroke the piston C descends in the cylinder A, partly owing to its weight and partly owing to the suction effect. While the piston moves downward the inlet valve D opens and air enters the upper end of the pump cylinder through the passages G., After the tire has been fully inflated the pump is unscrewed from the motor cylinder and the spark plug put back in place.

### The McKeen Carburetor.

The accompanying half tone cut shows a carburetor designed by the McKeen Motor Car Company for use on their gasoline railroad cars of 200 horse power. It is claimed that owing to the fact that a motor car of this kind must frequently be operated at very low speeds, a special design of carburetor is necessary in order to insure the production of a properly dosed mixture throughout a very wide range of suction The spraying principle has, therefore, been done away with, and the absorption principle is used instead, and it is claimed that the amount of gasoline evaporated and absorbed by the air is a direct function of the quantity of air passing through the carburetor. Some experiments with this carburetor have recently been made on an Apperson six cylinder automobile.

# The Beyster-Detroit Delivery

Wagon. The Beyster-Detroit Motor Car Company, whose organization was announced recently, have placed on the market a delivery car, with a capacity of 1,200 pounds, and selling at \$1,000. It is planned to turn out 1,000 of these cars from the company's factory at 1329 Woodward avenue, Detroit, during the coming year.

The car is equipped with a four eylinder motor of 31/4 inch bore by 35/4 inch stroke, rated at 25 horse power. It has an offset crank shaft, which is carried in die cast babbitt bearings, and a fan bladed flywhed is mounted in front. The cooling water is circulated on the thermo-siphon principle. and ignition is by Remy or Splitdorf high tension magneto and storage battery.

A conical clutch running in oil is usel, and a selective type sliding gear transmission is fitted. The drive to the rear wheels is by double chains enclosed in dust-proof aluminum housings and running in oil. Two sets of brakes, both lined with Thermoid



MCKEEN CARBURETOR

act on drums on the rear hubs. The car has a wheel base of 105 inches; 56 inch or 60 inch tread is optional, and the tire equipment consists of 34x2 inch Swinehart solid tires. The front springs are semi-elliptic and the rear springs full elliptic. The weight of the car empty is in the neighborhood of 1,000 pounds. The car is geared to 25 miles per hour, but higher gears can be furnished if so desired. The company call particular attention to the fact that this car was designed for goods carrying purposes from the bottom up, and that it is not a made over runabout with delivery body.

### Registration in Massachusetts.

The Massachusetts Highway Commission began to receive applications for reregristration for next year on December 1. The application blanks contain a number of questions relative to the horse power of the machine, the type of the machine, name of of manufacturer, manufacturer's number, manufacturer's horse power rating, number of cylinders, etc. Special emphasis is placed on the horse power, as the license fee is based on this. The commission will use the A. L. A. M. formulæ in determining the horse power. Owners are also required to state whether they disposed of any cars by sale during the year, the commission hoping in this way to keep track of old cars. Applicants for operator's licenses will have to make answer to sixteen different questions under oath. They will be required to state whether they have had a Massachusetts license before, and if so, what year and what number; the date of their birth, color, sex, height, weight, color of hair, of eyes; approximate number of miles they have driven and kinds of machines they have operated; whether they habitually use intoxicating liquors to excess; whether they have been convicted of any crimes within two years; whether they have any mental or physical disability, and whether they are familiar with the rules of the road. It is estimated that there are over 23,000 automobiles and about 2,500 motorcycles in the State.

### Trebert Gas Engine Company Now at Butler, Ind.

The Trebert Gas Engine Company, formerly located at Rochester, N. Y., have removed to Butler, Ind., where they went because of the more central location as one reason. They inform us that they have largely increased their capacity. J. George Wagner is manager of the company, who turn out engines and transmissions.

### To Make Axles at South Bend, Ind.

A new company at South Bend is the Yuster Axle and Transmission Company, which has been organized with an authorfzed capitalization of \$100,000. Automobile axles and transmission will be manufactured. Those interested in the company are M. Y. Yuster, A. G. Wile and Joseph M. Ricketts. The company will begin operations immediately.

### Fort Lee Hill Climb Concluded.

The remaining events of the Edgewater-Fort Lee (N. J.) hill climb were run off on Friday last. The course was in excellent condition, and as there were fewer spectators present there was not that interference with the contestants which brought the Thanksgiving Day meet to an untimely end. The best time of the day was made by George Robertson in a Simplex, who ascended the hill in 53 2-5s. This time was made in the event for cars selling at over \$4,000. Robertson also won the event for stock cars of 451-600 cubic inch piston displacement in 56s.

Tom Kincaid, in a National car, made second best time, viz., 55s., and won the event for stock cars of 301-450 cubic inch piston displacement.

One accident occurred during the day. Ray Howard, driving a Stearns 30-60 horse power car, ascended the hill at a fast clip and failed to make the last sharp turn. The car crashed into the curb and crushed its right front wheel. Howard was uninjured, and the car was gotten off the course in a few minutes. The summaries follow:

Gasoline stock cars, \$2,000 to \$3	,000;
Car and Driver. H.	P. Time.
National, T. Kincaid 4	0 0:56 57-100
Stoddard-Dayton, R. V. Morris. 4	5 1:07 3-5
National, F. Hurmance 3	
Selden, R. Carter 3	6 1:12 10-100
Pope-Hartford, J. E. Blakeslee. 4	0 1:13 27-100
Grout, P. H. Johnson 4	0 1:20 22-100
Knox, J. Westervelt 3	8 1:26 90-100
Walter, W. Walter 2	4 1:43 50-100
Gasoline stock cars, four cylin	ders, \$4,000 or
over,	
Simplex, George Robertson, 9	0 0:53 2-5

Stearns,	E. Bac	denhausen.		30-60	0:58 2-5	
Stearns,	C. H.	Powers		30-60	0:59 4-5	
		Heitmeyer				
		F. R. W				
Gasolin	e stock	cars, six	cylinder	18, \$3,0	oo or ove	ε.
		Spear.,		60	1:14 3-5	

			. All Brenn W				
Stanley,	H.	W.	Bell		20	0:54 1	-5
Stanley,	B.	G. 1	Faulhaber		20	0:58 3	-5
Simplex,	R.	T.	Heitmeye	T	50	0:59 3	-5
Stanley,	F.	W.	Bellows.		20	1105	
			chassis,			and 60	o cu

bic inches piston displacement.
Simplex, George Robertson.... 50 0:56 Simplex, R. T. Heitmeyer ..... 50 1:00 Locomobile, R. Whitcomb ..... 40 1:04 Gasoline stock chassis, between 301 and 450 cu-

bic inches piston displacement. 

### AMATEURS-CLASS A.

Stanley, B. G. Faulhaber ..... 20 0:57 Buick, Dr. W. H. Hafie ..... 30

### AMATEURS-CLASS B.

0:56 3-5 Zust, J. Derigne..... 35 Locomobile, R. Whitcomb..... 40 1:09 1-5 Commercial Motor Vehicles—Class A, delivery

wagons up to 1 ton capacity (net); Class B, trucks, up to 2 tons (net); Class C, trucks up to 3 tons or over (net).

### WACON-CLASS A.

Buick, E.	H.	Taylor	20	2:34 48-100
Simmons,	F.	Reitkowski	20	2:58 1-5
Renault,	1. 5	treet.	1.4	Not taken

### E-M-F Company Break Loose from Studebakers.

An announcement of a rather sensational nature was made last week, to the effect that the sales arrangement between the Everitt-Metzger-Flanders Company, of Detroit, and the Studebaker Automobile Company, of South Bend, Ind., had been discontinued, and that the products of the E-M-F Company would in future be sold through the company's own sales organization. It was generally supposed, and was announced at the time Messrs. Everitt and Metzger retired from the company, that the Studebakers held a controlling interest in the company, but, according to the announcement referred to, this is not correct. The reason given for the abrogation of the agreement is that the Studebaker Company did not take and pay for the number of E-M-F Thirties ordered by them during the months of October and November. The disagreements are thought to have their origin in the fact that the Studebaker Company would give agencies for the E-M-F only on condition that applicants would take the agency for the whole Studebaker line and sign up for a certain number of high powered gasoline and electric cars in addition to their allotment of E-M-F Thirties. This proposition is said to have met with disfavor on the part of many desirable agents. The E-M-F Company have begun an active campaign for agents.

The Studebaker Company of New York, represented by Manager Innis, deny the allegations in the E-M-F letter. They state that they have a definite contract with the E-M-F Company, and have lived up to it to the letter, which they also expect of the E-M-F Company.

Automobile Engineers' New York Meetings.

The Society of Automobile Engineers will hold two meetings in New York at the time of the coming automobile shows. The first will be held on January 4, at the clubhouse of the Automobile Club of America, on Fifty-fourth street, west of Broadway, and the second on January 13, at the Engineering Society's building, 29 West Thirty-ninth street. The society will also give a supper during the time of the show, but the place and date have not yet been decided upon.

The nominating committee has made its nominations for officers for the ensuing year, and the ballots have been sent out. The nominations are as follows: President, H. E. Coffin; first vice president, H. G. Chatain; second vice president, Professor Carpenter; managers, H. Cuntz, W. G. Wall and H. M. Donaldson; treasurer, A. H. Whiting.

The racing program of the Brooklands Automobile Racing Club of England for the coming year has been announced. Races are to be held on March 28 (Easter Monday), April 27-28, May 16, June 18, July 13-14, August 1 and October 5.

# COMMENTS AND QUERIES OF READERS.

### Magneto Nomenclature.

Editor Horseless Age:

Isn't it time for some linguistic genius to arise and offer a suitable set of names for magnetos and magneto systems, by which the present confusion and lack of accuracy might be avoided? Imagine a school teacher (automobile school, of course) asking his pupils to define a "high tension" magneto. It is said that grocers classify the staple product of the hen into fresh eggs, strictly fresh eggs and "just eggs." In the same way we have the high tension magneto, "true high tension magneto" and the plain "magneto," which usually satisfies the novice.

The trouble appears to arise from the fact that, while the spark ultimately produced is of the high tension variety in nearly all cases, the magneto in which the impulse originates may be either high or low tension. What the user is mainly interested in is the spark rather than the magneto, since the latter is only a means to the end. Consequently, when asked what ignition system he has or desires he replies, "high tension," as if that ended the matter.

To those in the trade, however, the matter is not so simple. Distinction between types is necessary, and it does not seem more reasonable to describe a magneto according to the ultimate spark than it would be to name the style of carriage according to the breed of horse that happened to pull it.

A magneto containing within itself the elements necessary for producing a high tension spark is fairly described as a high tension magneto, and its maker should not be driven to such verbal shifts as "arc light," "arc flame," or the prefix "true" to indicate his meaning, any more than the automobile builder should be required to prefix "actual" before his horse power rating.

The real need seems to be for some phrase to describe the type of low tension magneto whose current is delivered to a step-up coil and there transformed to high tension. To call it "low tension" without explanation is impossible, and "low tension with separate coil" is equally so. Why not simply name it the "coil type" magneto, leaving the jump spark to be inferred? Belt driven magnetos having separate coils could then be described as "non-synchronous" magnetos.

A similar need exists for verbal distinction between the various dual, semidual and hemi-demi-dual systems now on the market. Probably at least half a dozen could be counted, ranging all the way from that using the same interrupter, coil, distributor and plugs in both systems up to the only real dual system having the magneto and battery circuits entirely separate,

even to the spark plugs. The weight of practice seems to be divided between the real dual systems and the system which uses the same distributor and spark plugs, but with separate interrupters for the two circuits and a special coil for the battery circuit. The writer confesses himself staggered by the problem of finding a name even for the second of these two, but someone ought to find it, and when found it ought to be adopted.

HERBERT L. TOWLE.

# Starting in Cold Weather With the Aid of Acetylene from Tank.

Editor Horseless Age:

I do not know how many have made practical use of the suggestion contained in my article in your "Runabout" number as to the use of auto-gas introduced into the intake pipe for the purpose of easy starting in cold weather. I simply wish to state that further experience has justified all the claims then made. I used the device all last winter upon a single cylinder runabout, and have now installed it upon my two cylinder Buick, and one full turn of the crank set it off this morning, with the thermometer registering 30°. Many of my friends in the vicinity have made use of it with complete satisfaction. Any mechanic can easily and cheaply devise and install the necessary connections. For the good of the order, H. M. WHEELER.

### Clarifying Sperm Oil.

Editor Horseless Age:

I respectfully request that you will instruct me how to clarify and bleach sperm oil. I will greatly appreciate your courtesy.

J. J. E.

[The following three receipts for clarifying and bleaching sperm oil are taken from Cooley's Cyclopedia of Practical Receipts:

A. Sperm oil is purified by violently agitating it with boiling water or steam, by placing it in a deep vessel with a perforated bottom through which high pressure steam is forced for some time. It is afterward clarified by repose and filtered through coarse charcoal

B. The oil is violently agitated with a boiling hot and strong solution of oak bark to remove albumen and gelatine, and next with high pressure steam and hot water. It is lastly dried and filtered.

C. Each ton is boiled for half an hour with caustic soda, one-half pound, previously made into a weak lye with water, or steam is blown through the mixture for a like period; sulphuric acid, one-half pound, diluted with six times its weight of water, is next added; the whole again boiled for fifteen minutes and allowed to settle for an hour or longer, when the clear oil is run off from the water, and sediment into its

bleaching tube; here solution of bichromate of potash, 4 pounds, in oil of vitrol, 2 pounds, previously diluted with water q. s. together with a little nitric acid and some oxalic acid, are added, and after thorough admixture of the whole by blowing steam through it, strong nitric acid. I pound, diluted with water, I quart, is poured in and the boiling continued for half an hour longer; a small quantity of naphtha or rectified spirits of turpentine is then mixed in and the oil finally well washed with hot water and left to settle.—Ed.]

### Convenient Battery Tester.

Editor Horseless Age:

More or less complaint is heard by the manufacturers regarding dead or run down dry cells being shipped with the new cars. Some of these cases are unwarranted, while others are perhaps justified on account of a few cells among a lot of good ones being faulty and thus aging rapidly.

In order to catch any cells that might not be up to standard, the writer devised a simple tester made of an old buzzer or bell. The idea was that it should be so adjusted that a cell giving less than a predetermined amperage would fail to make it buzz, and to accomplish this easily, it was found that one coil should be cut out of the circuit and the springs adjusted with considerable tension to suit the particular case. Flexible wires with suitable handles or terminals were attached.

This buzzer was sealed and placed near the case from which the batteries were taken. By this means each individual cell of the set for a car could be tested in less time than it takes to tell it. If an attempt were made to test each cell with an ammeter much time would be wasted in waiting for the hand to settle.

If the buzzer is tested every few weeks it may be counted on for giving quite reliable results for all practical tests. The buzzer should, of course, be set for only one cell, since testing the entire set of cells would often fail to detect that one cell was dead while the others were in good shape.

The writer knows from experience that this is quite handy about a shipping room, and sees no reason why it should not be in some garages.

"Merowe."

# Number of Speeds on Small Cars. Editor Horseless Age:

I wish you would call the attention of the manufacturer of small cars to the advantages of putting three speeds into them. There are a lot of new small cars on the market, and all, or nearly all, of them have but two speeds. For a man who uses a car in his business, summer and winter, three speeds are almost a necessity, as deep mud or heavy snow will be too much for the high

gear, and the low gear is too slow. The cost of the added gears would be slight, compared with the increased value given the buyer.

I think most of these new makes put in two speeds just because some one else does. But any car of less than 20 horse power would be better with four speeds than with two, and should certainly have three at the least.

I do not think they would lose any sales by furnishing the extra gear, and I know that the next car I get will have three speeds.

I have used an automobile in my practice nearly every day since October, 1899, over ten years, and I know what I am talking about. During the ten years I have used a number of different cars. At present I have three cars, one 35 horse power roadster and two runabouts.

I find my little single cylinder runabout the most practical car I have ever owned, although hardly powerful enough for the winter work that will soon come. For the man who has only one car, a light car of 16 to 20 horse power, with three or even four speeds, is much more practical than a larger car.

A. N. CLARK, M. D.

### Rotary Cylinder Motors.

Editor Horseless Age:

Replying to Mr. Martin's query (November 17 issue) regarding Gnome motor I saw the item in a French daily paper, but regret inability to give name or date. In traveling one picks up a paper without keeping it in his memory. Later I found that a mechanically minded friend had heard the same story, and, accordingly, wrote to you for the details so kindly given.

One point, however, still puzzles me. The Gnome seven cylinder, 4.4x4.8 inch, is quoted by you at 1,177 revolutions as giving only 34.2 horse power. Now a standard motor of this size would give about 60 horse power. If your figures are right (which I doubt), what so much decreases the horse power in the Gnome?

Pardon my saying that you are wrong in stating that oiling is an unsolved rotary problem. The Adams-Farwell solves the oiling problem perfectly.

If Mr. Martin has been six years at work on rotaries he should know that one great unsolved problem in them is the speed. Standard motors run up to 1,800 revolutions when extra power is needed, and a few can be speeded to 2,200 for a few minutes. Rotaries are seldom built to run (because of centrifugal force dangers) at over 800 r. p. m. The Gnome, tested at 1,177, is the highest speed rotary cylinder motor I have ever known, and this speed is only possible because of the nickel steel cylinders used. It results that rotaries at 800 to 1,100 can only give half the emergency (hill climbing, bursts of speed, etc.) speed that the standard motor at 1,800 to 2,200 revolutions

Another problem lies in the great weight of the revolving motor, which, acting as a flywheel, makes an efficient clutch difficult to obtain, and more difficult to maintain. Will not Mr. Martin favor us with an article covering these and other "rotary" points? Many people would be interested.

# Calculation of Compression Pressure.

Editor Horseless Age:

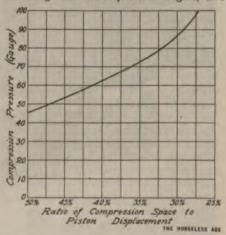
Will you please give me the rule for figuring the actual compression of a cylinder; that is, a rule which takes into account not only the compression due to the piston movement, but also the added compression due to rise in temperature?

M.

[The formula for the compression is

 $C = p \times \left(\frac{v_1}{v_2}\right)^{1 \cdot 35}$ 

where C is the compression pressure in pounds per square inch absolute; p the pressure in the cylinder at the moment compression commences; v<sub>1</sub> the volume of the charge when compression begins, and



v<sub>2</sub> the volume at the end of compression. p is, of course, somewhat less than atmospheric pressure, and may be taken as about 12 pounds per square inch. The above equation has to be solved with the aid of logarithms. If you are not familiar with these you can use the accompanying curve. The equation gives the absolute compression pressure. If you want the gauge pressure you subtract 14.7 pounds from this.—Ep.]

### Using One Cylinder of a Motor for Tire Inflation.

Editor Horseless Age:

There is a suggestion in your last number about pumping tires that seems to me to be of considerable value.

Everyone knows that this is one of the most objectionable features of an auto, and it seems to me it would be quite practicable to make one cylinder of any multicylindered auto serve as a pump for air by a suitable system of pipes and cutouts, while it is driven by the other cylinders. This would avoid any question of injurious gases, get rid of the weight of the extra pump, and as the pipe connections need not be very heavy, would add scarcely anything to the weight of the engine and accessories. William H. Seaman, M. D.

### Duration of Storage Battery Charge When Operating Tungsten Lamps.

Editor Horseless Age:

How many hours would a six volt, 160 ampere hour storage battery furnish sufficient current for two headlights, fitted with 8 or 12 candle power tungsten lamps and a tail light with a 2 candle power lamp, on a single change?

A. G. A.

[Assuming that your storage battery delivers its rated capacity and that the tungsten lamps have an efficiency of I candle power per watt, which is a good average, the battery would last 53 hours with 8 candle power headlights, and 37 hours with 12 candle power headlights.—Ep.]

### Mathematical Articles.

Editor Horseless Age:

The writer has noted your editorial in this week's issue of THE HORSELESS AGE concerning the lack of appreciation of mathematical articles appearing in your valuable paper; and as one of the readers and keen appreciators of these articles the writer enters his protest against their omission in the future. It does not seem commensurate with automobile engineering progress in this country that engineering and technical articles in this line must be sought entirely in foreign journals, as you must well know that THE HORSELESS AGE is the only publication appearing in this country in which articles of this nature have found place for some time past. I trust there may be enough protests raised from the engineer readers of your paper to insure the continuance of these technical and mathematical articles as in the past.

FREDERICK HUGHES.

Editor Horseless Age:

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I have just read your article on mathematical treatment of automobile matters in The Horseless Age, in which you ask for an expression of opinion about them.

I am not especially a mathematician, and do not often follow out these articles into their formulas and tables, but I hold that the mathematical method is the only one that has real value, and whenever I want to make up my mind on any point it is the mathematical articles on that subject to which I turn for exact information.

If people generally would follow this plan we would have much less time and energy wasted on useless, imperfect and impracticable projects.

WILLIAM H. SEAMAN, M. D.

Editor Horseless Age:

I note your editorial in Horseless Age of December 8 on the question of publishing technical articles of a mathematical nature.

For myself I may say that I am always glad to see such contributions, as they have a permanent value for purposes of reference, and I know of others besides myself who take advantage of them.

FRED N. HOWARD.

# THE FIELD OF COMMERCIAL APPLICATIONS.

### New Motor Delivery Equipment of the Wanamaker Stores.

The John Wanamaker stores, New York City and Philadelphia, are adopting a system of motor delivery which, in many respects, is an innovation, and it is believed will result in great increase in the commercial automobile business. Both the New York and Philadelphia stores of this concern have suburban stables for their delivery wagons, and the new system of delivery consists in transporting goods by large motor trucks to these stables, whence they will be delivered by the smaller delivery wagons.

The trucks to be used for this work are built by the Packard Motor Car Company, and are built on a chassis similar to that described in our issue of April 22, 1908. The load at which they are rated is three tons, though in the present service a load of over two tons is exceptional. The body is built to receive an inner body which may be put in and taken out loaded, and is so constructed that when In place no vibration can occur. This makes it possible to keep the trucks almost continually on the road, for when a loaded car reaches its destination in the suburbs the loaded inner body is taken out and an empty one put in its place. The truck then returns to the store, where the empty body is removed, a loaded one substituted and another trip is begun. While the cars are on the road the bodies are loaded at the store and unloaded at the stables, so that no delays need occur. It is also planned to use these cars for the delivery of large orders of furniture, which can be very safely loaded in them, since the sides are provided with rows of knobs, making it possible to thoroughly rope the load to prevent vibration and damage. The New

York store has been using two of these cars for several weeks, and reports the results as being quite satisfactory. Seven more have been ordered for the New York store and two for the Philadelphia store.

communicating buildings, formerly used as a foundry, one 75x100 feet and the other 50x100 feet, one story in height. Concrete floors have been laid in these buildings, and they are now being transformed



PACKARD THREE TON TRUCK IN USE BY WANAMAKER STORE.

cars and its other motor delivery equip- for commercial cars. The larger building ment the New York store has secured the has a floor space entirely free from posts. premises at 541 to 553 West Twenty-fifth and will be used mainly for storage, while street, New York. This comprises two the smaller one has a line of columns

For the storage and maintenance of these as rapidly as possible into a model garage



INSERTION OF EMPTY INNER BODY.

lengthwise in the centre, and will be used principally for repair work. For carrying on incidental repairs a full machine tool equipment, probably with individual motor drive, will be installed. A Bowser gasoline storage outfit, with tank located beneath the floor of the larger building, is already in place. There are two wash racks, one in each of the buildings. There is to be no elaborate system of fire protection other than the customary sand barrels and hand extinguishers, for the buildings are both semi-fireproof.

# Taxicabs in Wilkes-Barre, Pa. By John B. Mooney.

Although the members of the Posten Transfer Company, who operate the only taxicab company in Wilkes-Barre, Pa., declare that if they had it to do over again that they would never install taxicabs in this city, the general impression among automobile men is that a good, quick, up to date taxicab business here operated by the taximeter system would be a paying proposition.

The Posten Transfer Company one year ago purchased two taxicabs, and have been operating them in the city since that time. The cabs are kept busy during the day, and particularly so at night, the company, however, operating twelve horse driven cabs at the same time. The writer interviewed the members of the Posten firm as to the success they have had with the cabs, and they were emphatic in stating that taxicabs were too expensive to operate in a small city, and that the cost of tire repairs and general overhauling of the cabs used up the profit, the gentlemen asserting that the company for the money expended could realize as much from two horse cabs as one taxicab. The Posten Transfer Company, which operates the cabs, is located at 33 North Main street, right in the heart of the city. A sub-station is located at the Lehigh Valley station several blocks away, the cab firm meeting all trains that arrive in the city.

The cabs are not kept in a separate garage, but are stored along with the horse driven cabs. Four men are employed as drivers, they working twelve hour shifts.

At the general office on North Main street the cabs are stationed when not in actual service, although the management endeavors to have them meet all incoming trains. At the stations a hacking business is carried on, and from personal observation it was found that every customer preferred the quick taxicab to the old method of horse driven cabs.

An ordinance is about to be presented in the city council which will regulate the business to some extent, the idea of the councilmen being to charge a flat rate of 25 cents for the first four blocks, and an additional 25 cents for the next six blocks, or a dollar to the city line, a distance of about a mile and a quarter by the longest route.

The Posten Company at present charge

50 cents for one or two customers within five blocks of the station, and then increase the rate, sometimes securing as high as \$2 per person for crossing the city line and going to the different suburbs. There is no accommodation for baggage outside of a dress suit case, the company operating a baggage line in connection with their other business, and following up the cabs with these wagons. A special flat rate is offered to daily customers, however, but this does not drop under 25 cents for three blocks. As to summer resorts, the company charge as high as \$10 for three to Harvey's Lake, 14 miles from the city along a good State road. There are no taximeters connected with the service, the driver always being allowed to use his discretion in regard to price. The repairs to the cabs are made at the local garages, and consist mainly of tire repairs, although one of the machines was out of commission for a week, owing to a broken axle, which was replaced direct from the factory.

The daily average mileage of each cab is about 50 miles, although this has been exceeded on many occasions. The drivers are given a percentage of the hourly earnings, and they have no fault to find. The gasoline and car ready for service is furnished to the operators. According to the firm the best hours for business up to date have been from 9 p. m. to 6 a. m.

The general opinion prevalent here, however, is that if a good, up to date taxicab company started in business here they could make money. Wilkes-Barre is located in the centre of a population of 200,000 people, all of whom come to the city to secure entertainment and purchase living necessities. There are 34 miles of paved streets, mostly asphalt, within the city limits, and extending out from this are miles of macadamized roads. There are forty-five trains arriving daily in the city, bringing hundreds, besides the best equipped third rail system in the country between Hazleton, 50 miles away, and Scranton, 25 miles from here. Eight different railroad companies come into the city, principally from New York and Buffalo, and hundreds of traveling men are here each week. I interviewed several liverymen in regard to a taxicab business here, and they expressed themselves as being only too willing to take up the proposition in case some firm would install cabs here on a percentage basis. The Posten Company does not advertise its service to any extent, the idea being to keep as many of the customers riding in the old style cabs as possible. The present company has kept no record of oil consumption, and has not entered into the business in a manner which would result in its securing the business.

A Croxton-Keeton taxicab, French type, has been purchased by Frank Mulkern, the pioneer automobile liveryman of Milwaukee, Wis. He has converted all of his cars into taxicabs by equipping them with standard taximeters.

### Electric Stage Line Profits.

The Fifth Avenue Coach Company, New York, has made its first annual report to the Public Service Commission, covering the year which ended on June 30, 1909. The investment is put down as about \$400,000, which is \$230,000 more than in 1908. The total revenue from passengers carried was \$359,405, and the total expenses of operation \$225,566, leaving an income of approximately \$144,700. Of this amount \$65,595 is charged to depreciation, and after taxes and interest on advances have been deducted there remains a net income of \$22,039.

### Commercial Notes.

An automobile stage service has been established between Fort Casey and Coupeville, Ore., by a sergeant of the 149th Company of the Coast Artillery Corps.

The address of the Grabowsky Power Wagon Company, of Detroit, Mich., was erroneously given as Pontiac, Mich., on page 636 of our December 1 issue.

The department store firm of Frederick Loeser & Co., in Brooklyn, N. Y., have recently acquired a number of Packard 3 ton trucks for the delivery of furniture to suburban points and similar long distance work.

Clarence F. Samuelson, chief of the Manila fire department, is in the United States at present inspecting motor propelled fire apparatus, the Manila authorities having decided to equip the department on a motor basis

The Police Department of Scranton, Pa., will shortly be equipped with an Indian motorcycle, the warrant for the order having been signed by the director of public safety and the mayor, and the order given to John Rawlings, who handles the Indian in Scranton. The price of the machine is \$288.80.

Frank Atterberry, who conducts a motor stage service between Sacramento and Folsom, Cal., has ordered from A. Meister & Sons Company, of Sacramento, a two wheeled trailer, capable of seating five passengers, which is to be attached to his motor stage. A recent trial with the trailer is said to have proven entirely satisfactory.

Commissioner of Motor Vehicles J. B. R. Smith, of New Jersey, has sent notice to every person who took out a license in the State this year, to the effect that all licenses must be renewed by December 31, and that the department is now ready to receive applications for renewal. No application for retention of the old numbers will be considered this year.

The Omaha Board of Fire and Police Commissioners have given a contract for two motor propelled patrol wagons to Guy L. Smith, the local Franklin agent. Smith agrees to furnish a 42 horse power patrol wagon at a cost of \$3,765 within ninety days, and a second at 10 per cent. less at a later date, and in the meantime will conduct the service for the police department at \$200 per month.

# AUTOMOBILE LAW AND LEGAL EVENTS.

The Massachusetts State Law Regarding Taximeters,

For some time the control of taximeters has been a vexed question with many legislators, both municipal and State. The legislators of Massachusetts, however, some time ago realized that the taximeter is a sort of measure by means of which services rendered to the passenger are measured on the basis of distance covered and time consumed, and, therefore, the inspection of such instruments, as far as accuracy of the same is concerned, comes within the province of those who have charge of the inspection of weights and measures. However, in order that there might be no dispute in the matter, a law was passed this year placing the inspection of these matters under the State Commissioner of Weights and Measures, and providing for a fee of \$1 for the inspection and sealing of the same. This law was published in full in THE HORSELESS AGE of December 1.

This law in no way interferes with the rights of towns and cities to make such regulations as they may see fit as to the rates of fare, etc. The details as to the method of inspection and sealing and the allowable percentage of error are, however, left entirely to the judgment of the commissioner, as well as discretion as to what forms of mechanism shall be condemned or approved.

Considering the fact that little is generally known about the subject at the present time, and, further, that such regulations should be the result of practical technical knowledge, the wisdom of this course is apparent.

To comply with the law the commissioner has sent out to all the users of taximeters in the State, so far as they are known to him, a copy of the law, and also a circular letter stating that the inspection of the meters is about to be taken up by his office, and that no meters will be inspected and spaled which are not driven from the front wheels of the vehicle.

The method of inspection will be to run the machine over a given mile course on a given tariff. These course are marked by bronze plates let into the curbstone—at the start and finish of the mile, as well as the one-third and one-quarter mile points.

Three of these courses have already been laid out in the city of Boston, one on Beacon street, starting about 25 feet west of Charles, and ending opposite 468 Beacon street, between Hereford street and Massachusetts avenue. A duplicate course starts at this point and runs back to Charles street. The plates for this course are set on the opposite side of the street. The other courses will be on Commonwealth avenue, starting just west of Arlington street.

The third course will be on Columbus ave-

nue, starting just west of Dartmouth street. Considerable care had to be exercised in laying off these courses so that the marks would not come at the intersection of cross streets. The object in having more than one course to a city is to insure that a course is at all times available which is not obstructed by street excavations, etc. It is proposed to have courses laid out in other cities as soon as the demand is felt for them. Courses will probably soon be laid out in Springfield, Worcester, Fall River and Lowell. The method of testing will be to keep



A FULL SET OF THE PLATES USED TO MARK A COURSE FOR THE INSPECTON OF TAX-IMETERS IN MASSACHUSETTS.

the cab as close as possible to the right hand curb and at the start of the course to throw the "flag" to the operating position under Tariff No. 1. According to Boston regulations this corresponds to 30 cents for the first half mile. At the half mile point this should change to 40 cents; at the three-quarters to 50 and at the mile to 60.

The cab can then be turned round, and, going back along the opposite curb, tested for Tariff No. 2. This calls for 30 cents for the first third of a mile and 10 cents for each additional sixth of a mile. The change, of course, should occur at one-third of a mile to 40 cents, at the half mile to 50. at two-thirds of a mile to 60, and at the mile to 80, the change to 70 occurring between three-quarters of a mile and a mile. For waiting time, which is charged at the rate of \$1 per hour, or 10 cents for six minutes, the inspector will use a timepiece of some sort, presumably a stop watch. The commissioner takes the view that it is the duty of his office to protect the public and to see that they get the proper amount of mileage and waiting time for which they pay, and according to present plans meters will be rejected only when they give short measure.

This law also covers the inspection of odometers, which may be used on commercial vehicles, such as trucks, for determining the charge for transportation of a load from point to point, if the charge is figured directly from the indications of the instrument; but not if the odometer is used simply as a basis of estimate.

The measured courses should be of value to all automobilists for testing the accuracy of their odometers.

### St. Louis Model Garage Bill.

The St. Louis legislative department has adopted a model garage bill, which is being re-enacted successively for each applicant to open an automobile garage. The model bill is intended to facilitate legislation and provide uniform regulation for the guidance of officials who are to enforce the law, and to prevent possible charges of partiality by some of the applicants. About ten garages have been opened under authority of ordinances passed in the last six months, and bills are pending for three or four more. The first of the model ordinances was signed December 6 by Mayor Kreismann. All those pending have been amended to conform to the new requirements. Building laws in St. Louis require legislative permission to erect a building for a garage or to conduct an automobile busi-

Following is a copy of the model bill, words in capitals being those which change to fit varying applications:

"JOHN DOE, his heirs, administrators, or assigns, is hereby authorized to erect a brick building to be used for an automobile garage on a lot of ground, or portion thereof, said lot being ONE HUNDRED feet in width and ONE HUNDRED AND SIXTY feet, more or less, in depth, on the NORTH SIDE OF BELMAR BOULE-VARD, BETWEEN GOODFELLOW AND HAMILTON AVENUES, being lots numbered FIFTEEN AND SIXTEEN OF 'CLEMENS PLACE,' in city block num-ber FORTY-FIVE HUNDRED AND FORTY-THREE, and the said JOHN DOE, his heirs, administrators, or assigns, is hereby authorized to maintain and carry on an automobile garage; provided, the said JOHN DOE, his heirs, administrators, or assigns, will at all times keep the premises herein mentioned in a clean and sanitary condition, as required by law; and, provided, and upon the conditions that there shall be no testing of automobiles permitted in the alley back of said garage, nor chauffeurs permitted to sit on the sidewalk in front of said garage, nor chairs or benches placed in front of said garage; and that there shall be at all times maintained in said garage an electric bell with push button which can be rung from the front or rear of said garage for the use of chauffeurs in attracting the attention of employees for the purpose of having them open the doors of said garage. Upon the violation of any of the foregoing conditions the right to maintain and carry on an automobile garage in above described premises shall at once cease and determine."

The provision proscribing the testing of machines in the alley and that requiring electric bells in the garage are both intended to prevent unnecessary noise. Most " of the garages are being established on the few business streets which run through the residence districts, and the alleys in the rear separate the garage in most cases from the home of wealthy residents, who protest against the garages on account of noise. Some of the bills passed in the last few months have provided specially that no opening be left in the rear wall of the building large enough to take an automobile in or let it out, which is another way of preventing noise in the rear. One or two bills have provided any opening of any kind in the rear wall, not even allowing a door for entrance of employees.

# The National Legislative Convention in Washington, D. C.

The legislative board of the A. A., A., which first advocated the policy of uniformity in automobile laws, is about to bring the matter more prominently before the country at large by the first National Legislative Convention, which will be held in Washington, D. C., February 15, 16 and 17. Charles Thaddeus Terry, chairman of the legislative board, has been invited by the officers of the National Civic Federation to speak before that body on this subject at the National Conference on Uniform Legislation to be held in Washington January 17, 18 and 19, just one month before the convention under the auspices of the national automobile body of the United States.

Delegates from all the clubs in the national organization have been requested to attend the February convention, and invitations have been extended to the Governors of all the States in the Union, inviting them to be present in person or by one or more officially accredited representatives. The purpose of the convention is twofold—first, to secure the passage in Congress of the Federal Motor Vehicle Registration bill, and, second, to bring before the official delegates of the various States the necessity of enacting a uniform State motor vehicle law.

In referring to the work accomplished since 1907 for a uniform State motor vehicle law, Mr. Terry said that the progress made thus far was highly encouraging. In twenty-eight States some of the more important features of this State law have already been enacted. Those States which now exempt non-residents from paying an additional

registration fee, provided such motor users have complied with the law is their home States, are: New York, California, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, North Carolina, Ohio, Oregon, South Dakota, Utah, Washington and Wisconsin. In Massachusetts, Vermont and Pennsylvania nonresidents are exempt from registration and license fees for ten days; in Rhode Island for twenty days.

The registration fees, however, vary greatly. In Nebraska and South Dakota the fee is \$1; in Minnesota, \$1.50; in Tennessee, Utah, Maine, Virginia, Washington, Wisconsin and Florida, \$2; in Oregon, Michigan and Maryland, \$3; in Ohio, North Carolina, Missouri and Iowa, \$5; in New Hampshire, \$10, all these being a flat registration fee without regard to the horse power of the machine.

The new Michigan law, enacted at the last session of the Legislature, is a rather close copy of the A. A. A. Uniform Automobile State bill.

Damages Awarded Patentees of Cellular Radiator.

The infringement suit of the Daimler Motor Company, of Unterturkheim, Germany, against Megevet & Cie., of Geneva, Switzerland, has just been decided by the Swiss Supreme Court in favor of the Daimler Company, but instead of damages to the amount of 7,673,000 francs asked for by complainants for infringement of their honeycomb radiator they were awarded only 300,000 francs. The Court of Appeals, of which they had asked an award of 2,250,000 francs, awarded the Daimler Company only 70,000 francs.

### Wisconsin Oil Inspection Law Upheld.

The Wisconsin oil inspection law is held valid by the State Supreme Court, and the Wadhams Oil Company, of Milwaukee, Wis., is denied an injunction to restrain its enforcement. The fee is 10 cents a barrel.

Lava Burner Tip Patent Annulled.

The American Lava Company, of Chattanooga, Tenn., have won their fight against the Dolan patent, No. 589,342, which was claimed to be a basic patent on lava tipped acetylene burners, in the United States Supreme Court at Washington on November 20. The cases were known as D. M. Steward, M. Kirchberger et al. vs. American Lava Company and Paul J. Kruesi, and M. Kirchberger et al. vs. American Lava Company and Paul J. Kruesi, and have been in the courts for over seven years. The Supreme Court sustained the Court of Appeals on the ground that the Dolan patent is invalid because of insufficient specification and improper amendment.

### Legal Notes.

The Secretary of State of Minnesota began to receive applications for 1910 license tags on December 8. The 1910 tags have gold letters on a black background.

The Pennsylvania Attorney General's department has ruled that motor vehicles of all kinds, including motor fire wagons and ambulances, must display State license tags.

The police authorities of Plains Township, Pa., have declared war on automobile speeders, and eighteen drivers were arrested recently for speeding on the new macadam road in the township.

The authorities of Duluth, Minn., are considering an amendment to the city charter which would allow of a wheel tax. The amendment will probably be submitted to the voters at the election to be held in February.

The State Highway Department of Pennsylvania has adopted the A. L. A. M. horse power formula for determining the horse power of cars for the purpose of evaluating the tax imposed by the new law which goes into effect on January 1.

Advices from Boston are to the effect that the Metropolitan Park Commission are strictly enforcing the anti-chain ordinance on the park drives and boulevards. The police are strictly enforcing the eight mile limit on Beacon street at St. Mary's

Considerable surprise has been caused by the action of the board of supervisors of Waukesha County, Wis., in memorializing the Legislature to enact a law taxing every automobile owner \$50 a year for the use of public highways. The board is composed mainly of members from the farming communities.

Because of the frequent accidents the police department of Columbus, Ohio, has received strict orders to enforce the laws regulating traffic. Hereafter anyone driving an automobile or horse drawn vehicle will be arrested for using the wrong side of the street, and he will be prosecuted to the full extent of the law.

In Michigan about 12,000 licenses were issued this year, and it is expected that the number will reach 15,000 next year. Under the new law the numbers are supplied from the Secretary of State's office at Lansing at a cost of \$3 each, which entitles the purchaser of the license to two steel numbers which are to be placed on the machine, one in front and one in the rear. Already twenty-five applications have been received for 1910 license.

### **Business Troubles.**

Wm. A. Geoghegan has been appointed receiver for the Cincinnati Motor Express Company, which has been operating a motor express service between Cincinnati and the Mill Creek Valley towns, with an office in Elmwood place, Cincinnati. The petition was made by several of the stockholders. It is alleged that the assets are worth \$7,500, and the liabilities amount to only \$3,200, but there is no ready money, and the stockholders refuse to further endorse the company's notes.

# Sign Boarding the Roads Around Chicago.

The Chicago Motor Club will shortly complete a campaign of sign boarding the country around Chicago, in which it has been engaged during the past two years. In planning the campaign the sign board committee of the club kept in mind the fact that eventually this work must be attended to by the various counties, for the reason that when the posts are put up through private enterprise there is nothing to protect them from the depredations of miscreants. Besides, the cost of sign boarding is so great that motoring interests cannot well be expected to bear it alone.

The Chicago Motor Club, therefore, figured that by taking four of the big trunk lines running out of Chicago and properly marking them an object lesson would be furnished with which the club might go before the county supervisors and ask that all roads be treated in a similar manner, and also go before the Legislature and ask for the enforcement of the old law, or the enactment of a new one, that will make it compulsory for road supervisors to keep all roads in their territories properly marked.

With the groundwork in sign boarding completed, the Chicago Motor Club has resolved to devote itself henceforth principally to the causes of good road and sign boards, believing that they are most closely connected with motoring success in the Middle West. The club believes, however, that success in both of these lines can only be achieved by the co-operation of the leading clubs and organizations.

The sign board campaign really started about three years ago, when the Illinois Sign Board Commission was formed, and nearly \$100 was raised by popular subscription to push the work along. Some sign boards were purchased and a few put up, but then the interest of the commission

failed, and eventually the Chicago Motor Club took up the work. At the annual meeting of the club a week ago Chairman Lawrence of the sign board committee announced that he had practically finished three of the four routes selected, and that the last one would be completed in a few weeks. At the end of this month he will have expended \$2,000 for signs, and will have put up 290 posts with 787 signs on them. In addition there will be placed at the corner of Jackson boulevard and

and Genoa Junction, which route was made possible by E. E. Ayer, who contributed the \$500 for marking this course. Both these are done at the present time. The route to Milwaukee is finished, with the exception of the last 15 miles, and this will be completed as soon as the ground is frozen, the Chicago Motor Company, Packard agents, having agreed to finance the proposition. This leaves only the Chicago-South Bend route to be marked, and this will be taken up at once.



SIGN POSTS ERECTED BY CHICAGO MOTOR CLUB,

Michigan avenue, Chicago, the central point of this movement, a large tablet giving the direction and distance to nearly every town of importance within 100 miles of Chicago.

Four routes will be ready for touring next summer. The first one completed is the one to Beloit, by way of Elgin, Algonquin and Lake Delevan. Another route will be to Lake Geneva, by way of Rogers Park, Niles Center, Wheeling, Wauconda

In carrying out the work the first thing the committee did was to send out expeditions to mark the various courses, picking out the locations for the signs. Three cross road maps were made in outline One showed the conventional four corners, and on it could be marked just where the post should go. Another showed two roads converging into one that could be marked in the same manner. A third showed a right turn, a left turn and a railroad crossing. Another part of the chart prepared showed where the various sign boards were to be put up. In this manner all the data required was collected hefore the signs were ordered. Then Mr. Lawrence sought hids for the work.

The Featherstone Foundry and Machine Company were the successful bidders for the signs, the prices agreed upon being 65 cents for a cast iron sign 20 inches long and 4 inches wide; \$1.15 for a double sign and \$1.75 for a triple sign. Where more signs were required on one post it was possible to use several styles and combinations, as, for instance, the Latrobe Steel Mills sign at Melrose Park. On the way to Elgin there is a sign on which there are seven tags. In all 787 signs were crdered, the aggregate cost of which was in the neighborhood of \$600. Then it came to the selection of posts on which these signs could be placed. The contract for these was placed with the Hines Lumber Company, which furnished 200 tamarack posts, 12 feet long and 4 inches square, at a cost

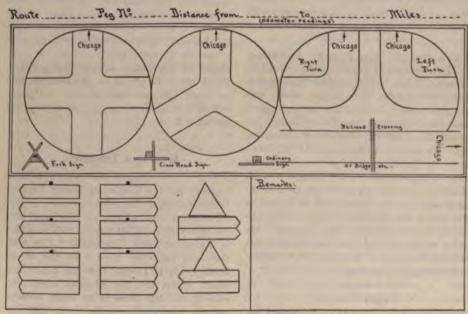


CHART PREPARED BY SIGNBOARD COMMITTEE.

of \$22 a thousand feet, the total cost being approximately \$100.

A contract was then made with Joseph T. Elmore and Herbert J. Ross, of the Chicago Ad Sign Company, to paint, deliver and erect these signs on the different routes at \$3.55 a post, the contract netting approximately \$1,000. The contract called for painting the posts with creosote paint, painting the signs themselves with non-rusting paint, painting the letters in white enamel, boring holes in the signs by which they could be fastened to the posts, attaching the signs and then putting up the posts in holes 4 feet deep. This completed, it was necessary to anchor and tamp each post.

Under the contract Elmore and Ross were to provide their own means of transportation. The Randolph Motor Car Company, of Chicago, donated the use of one of the company's light trucks, but Elmore and Ross paid the expenses of the expedition and the salary of the driver.

A supply of posts and signs is shipped along each route, a bunch being dropped every 30 miles. These are picked up by the truck and distributed over the next 30 miles of territory. It requires two men to place the signs. As one man is digging the 4 foot hole in the ground the other is attaching the sign to the post. It takes about three hours to place a post, and sometimes more, according to the conditions. At the Latrobe Steel Mills it took one day because the ground there is made up of steel filings, which made the work specially laborious. In favorable weather the expedition can label a 100 mile course in one week.

Considerable difficulty was encountered in getting all the permits for the erection of the signs, one objection frequently raised being that the signs would increase the motor travel along the routes, which was considered undesirable. In summing up the situation and the expense, Chairman Lawrence finds that to the cost of \$3.55 per post there must be added the sum of 15 cents a mile for pegging out the routes preliminary to putting up the signs.

Reduced Rates to New York Shows.

The American Automobile Association will hold open meetings at 437 Fifth avenue, New York, during the two automobile show weeks, and reduced round trip railroad rates of a fare and three-fifths have been granted by the Trunk Line Association. Members of the A. A. A. automobile clubs residing in the following territory can take advantage of the reduction: New York, New Jersey. Pennsylvania, Delaware, Maryland, District of Columbia, Virginia (points on Chesapeake & Ohio and Baltimore & Ohio), West Virginia, Ohio, Michigan (east of Lake Michigan), Indiana, cities of Louisville, Ky., and St. Louis, Mo. Stations in Illinois, including Chicago and points east of and on line of the C., R. I. & P. R. R., from Chicago to Peoria; thence the T., P. & W. R. R. from Peoria to Burlington; thence Mississippi River to Cairo, Ill.

A. A. Members residing at points outside of the territory above defined should purchase regular one way or excursion tickets to the nearest point from which a certificate reduction has been authorized, and there repurchase one way ticket and secure certificate to New York city.

Tickets and certificates for the Grand Central Palace Show may be purchased not earlier than December 28 nor later than January 2 for the trip to New York, which certificates when duly validated will entitle the holder up to and including January 11 to a continuous return ticket over the route upon which the going journey was made. Tickets and certificates for the Madison Square Garden Show may be obtained not earlier than January 5 nor later than January to for the trip to New York, which certificates when duly validated will entitle the holder up to and including January 19 to a continuous return ticket over the route upon which the going journey was made.

# Ohio Has Twenty-three Thousand Cars.

Ohio has 23,000 automobiles operated within its borders that have been registered with the State Automobile Department. That number was reached Saturday, December 11, and it is believed that no others will be registered during the present year. The twenty-third thousand set of plates were given to Miss M. L. Ferrin, 3666 Reading road, Cincinnati. State Registrar of Automobiles Fred H. Caley estimates that fully 40,000 motor cars will be registered during 1910. Applications for next year's registration are coming in fast.

Flat Tire Club for Indianapolis.

Automobile dealers and manufacturers of Indianapolis have organized the Flat Tire Club. This is a successor to the former Indianapolis Automobile Trade Association, which some months ago was merged with the Indiana Automobile Club, an inactive organization. The new club meets each day at a downtown café for lunch, and on Thanksgiving night had a banquet. Offi-

cers are: George A. Weidley, of the Premier Motor Manufacturing Company, president, and Frank B. Willis, of the Willis-Holcomb Company, secretary and treasurer.

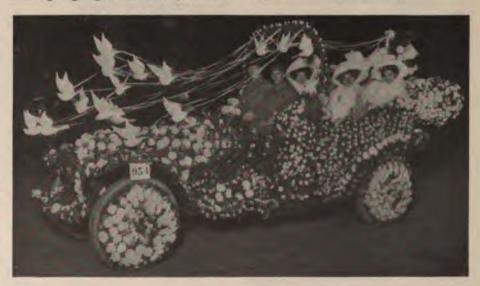
Program of Indianapolis Meet.

On December 11 fifteen entries had been received for the race meet to be held on the Indianapolis Motor Speedway at Indianapolis on December 17-18. It was expected that this list would be increased before the opening day of the program. Entries made at that time were as follows: Nordyke & Marmon Company, 3 cars; National Motor Vehicle Company, 5; Empire Motor Car Company, 2; Cole Motor Car Company, 2; American Motor Car Company, 1; Lewis Strang, driving a Fiat, and Walter Christie, driving a Fiat. A feature of the opening day will be sealing the brick course with a gold plated brick.

The race program will include speed trials for one-fourth, one-half, I mile and I kilometer, for all classes from under 161 cubic inches piston displacement to from 450 to 600 cubic inches. There will also be longer events, ranging from 5 to 100 miles, for practically all classes. The Speedway management has announced that the following meets will be held during 1910: May 27, 28 and 30, automobile races; July 1, 3 and 4, automobile and balloon races; July 23, aviation meet; August 12-13, twenty-four hour race; September 3 and 5, automobile races, and October 7 and 8, automobile races.

### Tastily Decorated Car.

The accompanying half-tone cut shows a 1900 Pierce-Arrow, 48 horse power touring car, owned by William Bausch, of the Bausch & Lomb Optical Company, of Rochester, N. Y., which won the prize in an automobile parade which formed one of the events during the Industrial Exposition held in Rochester, October 11-23. The car was decorated by J. B. Keller's Sons, florists, who used for the purpose 1,200 yards of smilax, 4,000 carnations, 1,200 chrysanthemums and 1,600 roses.



### List of Exhibitors at the Madison Square Garden Show.

MAIN FLOOR. Elmore Manufacturing Company. Everitt-Metzger-Flanders Company. Studebaker Automobile Company. F. B. Stearns Company. Knox Automobile Company. Columbia Motor Car Company. Autocar Company. Corbin Motor Vehicle Corporation. Matheson Motor Car Company. The Pope Manufacturing Company. Lozier Motor Company.
Locomobile Company of America.
American Locomotive Company. Packard Motor Car Company. Pierce Arrow Motor Car Company. Cadillac Motor Car Company.
Chalmers-Detroit Motor Company. E. R. Thomas Motor Company. H. H. Franklin Manufacturing Company. Winton Motor Carriage Company. Stevens-Duryea Company.
Peerless Motor Car Company. Buick Motor Company.

ELEVATED PLATFORM. Selden Motor Vehicle Company. The Willys-Overland Company. Hewitt Motor Company. Royal Tourist Car Company. Mercer Auto Company. Olds Motor Works. Haynes Automobile Company. Waltham Manufacturing Company. Hudson Motor Car Company.

Apperson Brothers Automobile Company. EXHIBITION HALL, MADISON SQUARE FRONT. Woods Motor Vehicle Company. S. R. Bailey & Co., Inc.

The Waverly Company. Babcock Electric Carriage Company. Columbia Motor Car Company. The Baker Motor Vehicle Company. The Anderson Carriage Company.
The Rauch & Lang Carriage Company. Studebaker Automobile Company.

BASEMENT, COMMERCIAL VEHICLE DEPARTMENT.

Knox Automobile Company. E. R. Thomas Motor Company. Studebaker Automobile Company. Baker Motor Vehicle Company. H. H. Franklin Manufacturing Company. American Locomotive Company, The Autocar Company. General Vehicle Company. Packard Motor Car Company. The Pope Manufacturing Company. Alden Sampson Manufacturing Company. Hewitt Motor Co. The B. F. Goodrich Company. The Diarmond Rubber Company. C. F. Splitdorf. The Goodyear Tire and Rubber Company. Atwater Kent Manufacturing Works.

G & J Tire Company.

Gray & Davis.

Pennsylvania Rubber Company.

R. E. Dietz Company.
William Cramp & Sons Ship and Engine Building

Baldwin Chain & Manufacturing Company.
Phineas Jones & Co.

Light Manufacturing and Foundry Company.

The Jones Speedometer.

Connecticut Telephone and Electric Company. C. A. Mezger.

Weed Chain Tire Grip Company.

N. Y. & N. J. Lubricant Company.

Republic Rubber Company.

National Carbon Company.

Aiax-Grieb Rubber Company.

Hartford Suspension Company.

Empire Tire Company. The R. E. Hardy Company.

Janney-Steinmetz & Co.

I. H. Sager Company.

American Ever Ready Company.

Auto Improvement Company. Witherbee Igniter Company.

The Globe Machinery and Stamping Company.

Leather Tire Goods Company.

Coes Wrench Company.
Cook's Standard Tool Company.

The Hoffecker Company.
The Edmunds & Jones Manufacturing Company.

Fox Metallic Tire Belt Company.

C. Cowles & Co.

Continental Rubber Works.

The Motz Clincher Tire & Rubber Company.

The Duff Manufacturing Company.

A. W. Harris Oil Company. Firestone Tire & Rubber Company.

Oliver Manufacturing Company.

The Timken-Detroit Axle Company. Timken Roller Bearing Company.

Warner Instrument Company.

Motsinger Device Manufacturing Company.

The Randall-Faichney Company.

Byrne-Kingston & Co. Spicer Universal Joint Manufacturing Company.
Pittsfield Spark Coil Company.

The Whitney Manufacturing Company.

Brown-Lipe Gear Company. Swinehart Clincher Tire & Rubber Company.

Warner Gear Company. American Ball Bearing Company.

The Standard Welding Company.

Badger Brass Manufacturing Company.

A. R. Mosler.

Gabriel Horn Manufacturing Company.

Joseph Dixon Crucible Company.

Heinze Electric Company.

C. T. Ham Manufacturing Company.

Valentine & Co.

Adam Cook's Sons.

Briscoe Manufacturing Company. The Gilbert Manufacturing Company.

Vacuum Oil Company.

Atwood Castle Company.

Herz & Co.

S. F. Bowser & Co.

Springfield Metal Body Company.

Michelin Tire Company.

Remy Electric Company.

Consolidated Rubber Tire Company.

Stewart & Clark Manufacturing Company.

Wheeler & Schebler.

Continental Caoutchouc Company.

The Fisk Rubber Company.

Veeder Manufacturing Company.

Morgan & Wright.

Diamond Chain & Manufacturing Company. The Hartford Rubber Works.

BALCONY.

Electric Storage Battery Company. C. A. Shaler.

Link-Belt Company.

High Wheel Auto Parts.

The Noera Manufacturing Company.

Havoline Oil Company.

Warner Manufacturing Company.

The Batavia Rubber Company.

Driggs-Seabury Ordnance Corporation.

Charles E. Miller.

The Sireno Company.

Champion Ignition Company. Keystone Lubricating Company.

Perfection Wrench Company.

R. I. V. Company.

Jeffrey-Dewitt Company. Thomas Prosser & Sons.

Eastern Carbon Works.

Simms Magneto Company.

Isaac C. Johnson & Co.

L. J. Mutty Company. H. H. Franklin Manufacturing Company.

High Frequency Ignition Company.

S. Hoffnung & Co., Ltd.

Peter A. Frasse & Co.

Lavalette & Co. J. S. Bretz Company.

George A. Haws.

K-W Ignition Company.

Morrison-Ricker Manufacturing Company.

New York Sporting Goods Company. The Carpenter Steel Company.

Pierson Motor Supply Company. Ernst Flentie. Allen Auto Specialty Company.

Geiszler Brothers Storage Battery Company.

Standard Leather Washer Manufacturing Company. William P. Miller's Sons.

McGraw Tire & Rubber Company. H. W. Johns-Manville Company.

BALCONY EXTENSION, MADISON AVENUE.

Emil Grossman Company.

The McCue Company.

The Stein Double Cushion Tire Company.

Tray Plate Battery Company.

Elite Manufacturing Company.

Riley-Klotz Manufacturing Company.

Hopewell Brothers.

The Motor Car Equipment Company.

The Novelty Manufacturing Company. Automatic Headlight Company.

Burn-Boston Battery & Manufacturing Company, Frank H. Cross.

New Jersey Car Spring & Rubber Company.
American Vanadium Company.

BALCONY EXTENSION, FOURTH AVENUE. Bosch Magneto Company.

Stackpole Battery Company.

Metal Stamping Company.

Vanadium Metals Company.

Zeglen Bullet Proof Cloth Company. Howard Demountable Rim Company.

Cox Brass Manufacturing Company. Philip C. Traver Manufacturing Company.

Lavigne Manufacturing Company.

Barnard Specialty Company. Stevens & Co.

Livingston Radiator & Manufacturing Company. Inc.

P. Reilly & Son. The Perfection Spring Company.

Detroit Motor Car Supply Company.

Wayne Oil Tank & Pump Company.

CONCRRT HALL

The Sprague Umbrella Company.

L. C. Chase Company.
Victor Auto Supply Manufacturing Company.

Columbia Lubricants Company of New York. A. O. Smith Company.

Thermoid Rubber Company.

Standard Roller Bearing Company.

Stromberg Motor Devices Company. U. S. Light & Heating Company. The Pantasote Company.

Federal Rubber Company.

Hayes Manufacturing Company.

Vesta Accumulator Company.

National Coil Company.

The Dayton Rubber Manufacturing Company. Hancock Manufacturing Company.

The Seamless Rubber Company.

C. M. Hall Lamp Company. Royal Equipment Company.

McCord Manufacturing Company.

Lebanon Steel Casting Company.

Briggs & Stratton.
Lovell-McConnell Manufacturing Company.

Rands Manufacturing Company.

Excelsior Motor & Manufacturing Company.

Gemmer Manufacturing Company. The Hess-Bright Manufacturing Company.

SECOND TIER.

Newark Rivet Works. The Wright Wrench Manufacturing Company.

C. A. Willey Company.

Kamiee Company. Hilton Manufacturing Company.

Dover Stamping & Manufacturing Company.

Grimm-Plaut Construction Company.

Calmon Asbestos & Rubber Works of America. Shipman Instrument Company.

Woven Steel Hose & Rubber Company.

Union Battery Company. The Waterhouse Company.

Motor Parts Company. Harry A. Allers Company.

Columbia Nut & Bolt Company.

Recometre Company of America. Room 7.

Rothstein Manufacturing Company.

B. M. Asch.

William R. Winn New York Coil Company. Vorhees Rubber Manufacturing Company. Gasoline Motor Efficiency Company. Favary Tire & Cushion Company. The Chandler Company. Rushmore Dynamo Works. The English & Merseck Company. E. M. Benford.

BASEMENT, ACCESSORIES. Merchant & Evans. James L. Gibney & Brother. W. E. Pruden Hardware Company. Como Electric Company. H. & F. Mesinger Manufacturing Company, Class Journal Company (Motor Age). Class Journal Company (Automobile). THE HORSELESS AGE. Valvoline Oil Company. Nathan Novelty Manufacturing Company. The A-Z Company. Julius King Optical Company. Motor. International Engineering Company. Motor Print. Motor Vehicle Publishing Company. Joseph Tracy. Burroughs Remountable Rim Company. Apple Electric Company. Chilton Printing Company. Nonpareil Horn Manufacturing Company. Erie Foundry Company. Livingston Radiator Company. Automobile Topics. The New Departure Manufacturing Company. The White & Bagley Company. The Vanguard Manufacturing Company. Ajax Trunk & Sample Case Company. Kilgore Manufacturing Company. The Post & Lester Company. Nightingale Whistle Manufacturing Company. A. S. Noonan Tool & Machine Works. The Willard Storage Battery Company. Philadelphia Storage Battery Company. National Auto Top Company. Troy Carriage Sun Shade Company.

BASEMENT, MOTORCYCLE DEPARTMENT. Merkel Light Motor Company. The Bicycling World. The Consolidated Manufacturing Company, N. S. U. Motor Company. Motorcycle Publishing Company, American Motor Company. Hendee Manufacturing Company. The Herring-Curtiss Company. Harley-Davidson Motor Company. Reading-Standard Company. Aurora Automatic Machinery Company, Greyhound Motor Works. The Pierce Cycle Company. Excelsior Supply Company. The New Era Gas Engine Company. Eclipse Machine Company. F. A. Baker & Co. Royal Motor Works, Inc.
The Miami Cycle & Manufacturing Company. Emblem Manufacturing Company. Marvel Motorcycle Company. Reliance Motorcycle Company. S. D. Manufacturing Company.

### Trade Literature Received.

Brewster & Company, New York City.-Catalogue of Delaunay-Belleville motor cars.

The Ohio Electric Car Company, Toledo, Ohio .-"The Ohio Electric and Its Construction."

Berkshire Auto Car Company, Pittsfield, Mass,— Catalogue of Berkshire motor cars for 1910. Rex Wrench Company, Boston, Mass.—Circular

of the Rex drop forged, adjustable wrench sets.

J. S. Bretz Company, Times Building, New
York.—Catalogue of the U. & H. Master magneto,
Muncie Gear Works, Muncie, Ind.—Circular of

the Muncie patented wheel brakes, sprocket wheels

and jack shafts.

The Scagrave Company, Columbus, Ohio.—
Booklet containing a reprint of an address on
"Motor Propelled Fire Apparatus," delivered before the Pacific Coast Fire Chiefs' Association in Seattle on September 9 last by J. H. Carlisle, chief of the Vancouver (B. C.) Fire Department, R. M. Owen & Co., Lansing, Mich.—Catalogue

of 1010 Reo cars.

The F. B. Stearns Co., Cleveland, Ohio.-Catalogue of Stearns motor cars.

Dayton Motor Car Co., Dayton, Ohio.—Cata-

logue of Stoddard-Dayton automobiles.

Gray & Davis, Amesbury, Mass.-Folder entitled "Electric Attachment for Gas Headlights."

The Sireno Co., 39 Cortland street, New York

City.—Catalogue of the Sireno electric born.
Ford Motor Co., Detroit, Mich.—Price list of
parts and instruction book for the Ford Model T. Indiana Motor Sales Co., Odd Fellows' Building, Indianapolis, Ind .- Circular of the Continental 35. Westchester Appliance Co., 13-15 Canal Place, Bronx, New York City.—Catalogue of automobile

Knox Automobile Company, Springfield, Mass. -Circular of advance information regarding Knox

pleasure cars for 1910.

Auto Improvement Company, 304-322 Hudson street, New York City.—Catalogue of "Ever Ready" speedometers for 1910.

The Beyster-Detroit Motor Car Co., 1329 Wood-

ward Avenue, Detroit, Mich .- Advance circular of

the Beyster-Detroit delivery car.

Hoyt Electrical Instrument Works, Penacook, N. H.-Circular of Type 35 Hoyt voltmeters and ammeters and T. U. voltammeters.

The Fritchle Automobile & Battery Company,

1510-30 Clarkson street, Denver, Col.—Catalogue of "The 100 Mile Fritchle Electric."

The Hartford Rubber Works Co., Hartford, Conn.—Booklet entitled "Between You and the Road," relating to Hartford automobile tires.

Stevens-Duryea Co., Chicopee Falls, Mass.— Leather bound pocketbook containing specifications and color samples of Stevens-Duryea cars.

H. H. Franklin Manufacturing Co., Syracuse, N. Y.—Booklet entitled "Why the Franklin Is the Most Comfortable and the Most Reliable of All Automobiles.

Isaac G. Johnson & Co., Spuyten Duyvil, N. Y. Booklet entitled "The Danger of Malleable Iron for Automobile Parts," relating to cast steel parts

made by the Johnson Co.

The Diamond Rubber Co., Akron, Ohio.—Catalogue of hard rubber parts; catalogue of motor buggy special tires and catalogue of the new Diamond demountable rim.

The Rapid Motor Vehicle Company, Pontiac, Mich.—Booklet, entitled "The Man from Missouri," relating to the part of the Rapid truck in the Glidden Tour last summer.

The Allen Auto Specialty Co., 1926 Broadway, New York.—Allen's Specialty for the Motor Car.
A catalogue covering tire holders of all descriptions, lamp covers, knuckle boots and tire casings.

### Coming Events.

December-Chicago, Ill., One Mile Straightaway Trials, Chicago M. C., during Christmas week. December 14-18—Dallas, Tex., Endurance Con-

test, Implement and Vehicle Journal.

December 17-Worcester, Mass., Endurance

December 17-Workerser,
Contest, Worcester A. C.
December 17-18—Indianapolis, Ind., Race Meet,
Indianapolis Motor Speedway.
December 25 to January 1—Columbus, Ohio, Au-

tomobile Show, Auditorium, Columbus A. C.

December 31 to January 7-New York City Annual Show, Grand Central Palace, American Motor Car Manufacturers' Association.

January 1-Philadelphia, Pa., Roadability Run from Philadelphia to Wilmington, Del., and return, Century Motor Club.

January 8-15-New York Annual Show, Madison Square Garden, Association of Licensed Automobile Manufacturers.

January 10-16-Portland, Ore., Annual Auto-

January 15-29-Philadelphia, Pa., Automobile

Show, Second Regiment Armory.

January 17-22—Kansas City, Mo., Automobile
Show, Convention Hall, Motor Car Trade Asso-

January 24-29-Portland, Ore., Automobile Show, Armory.

January 24-29-Detroit, Mich., Automobile Show, Wayne Hotel Gardens.

January 24-30-Washington, D. C., Fourth Annual Show, Convention Hall, Automobile Dealers' Association.

February-Grand Forks, N. Dak., Automobile Show.

February 4-6-New Orleans, La., Annual Mardi

Gras Speed Carnival, New Orleans A. C. February 5-12—The Ninth Annual National Show at Chicago, Ill., National Association of Au-

tomobile Manufacturers.
February 14-19—Buffalo, N. Y., Automobile Show, Broadway Arsenal, A. C. of Buffalo and Buffalo Automobile Trade Association.

February 14-19-Hartford, Conn., Automobile Show, Foot Guard Hall, Hartford Automobile Dealers' Association.

February 14-21-St. Louis, Mo., Annual Auto-

mobile Show, National Guard Armory.
February 19-26—Newark, N. J., Automobile Show, Essex Troop Armory.
February 19-26—Salt Lake City, Utah, Automobile Show, Auditorium.

February 21-26-Binghamton, N., Y., Automo-

bile Show, State Armory. February 21-26—Minneapolis, Minn., Automo-bile Show, National Guard Armory.

February 21-26—Cincinnati, Ohio, Automobile Show, A. C. of Cincinnati.

February 21-27—Cleveland, Ohio, Automobile Show, Central Armory, Cleveland Automobile Association.

February 22-27-Milwaukee, Wis., Automobile Show, Auditorium, Milwaukee A. C. February 24 to March 3-Toronto, Canada, Au-

tomobile Show, St. Lawrence Arena, Ontario Motor League.

February 26 to March 5-Kansas City, Mo., Fourth Annual Show, Convention Hall, Kansas City Automobile Dealers' Association.

February 28 to March 4-Omaha, Neb., mobile Show, Omaha and Council Bluffs Dealers,

March—Rochester, N. Y., Automobile Show, March 5-12—Boston, Mass., Automobile Show, Mechanics Building, Boston Automobile Dealers' Association.

March 14 to 19-Syracuse, N. Y., Automobile Show, State Armory, Automobile Dealers' Association.

March 21 to 28-Second Annual Show, Auditorium. Denver Motor Club.

March 26 to April 2-Montreal, Canada, Fourth National Automobile and Sportman's Show. March 26 to April 2-Pittsburg, Pa., Automobile

Show, Duquesne Garden Automobile Dealers' As-

May 30-Denver Col., Road Race, Denver M. C.

### Foreign Events.

January 10-Paris, France, meeting of Inter-

January 28 to February 5—Edinburgh, Scotland, Automobile Exhibition at Waverley Market, Scot-tish Motor Trade Association,

March 19 to April 3-Berlin, Germany, Automobile and Motor Boat Exhibition.

June 2-8-Annual Prince Henry Touring Com-

petition, German Imperial Automobile Club.

The Motor and Accessory Manufacturers' Association will hold their annual meeting at the Waldorf-Astoria Hotel, New York, on January 5, at 6 p. m., and their second annual banquet at the same place and on the same date at 8 p. m.

The Manufacturers' Contest Association will hold its first annual meeting at the Manhattan Hotel, New York, on January 7. President Benjamin Briscoe will preside.

## GARAGE AND SALESROOM.

### Dealers' Association Notes.

The dealers of Des Moines, Ia., are discussing the advisability of holding a local show in the Coliseum some time in February.

Detroit automobile dealers and manufacturers drew for space at the show to be given in the Wayne Casino, January 24-29, on December 1. Fifty-eight different makes of cars will be exhibited, of which thirty-two have never been shown in Detroit be-fore

The Automobile Dealers' Association of Syracuse, N. Y., at a meeting held at the Yates Hotel on December 6, decided to hold their annual show in the State Armory on March 14-19, immediately following the Boston show, and started active preparations for the event.

Drawings for spaces at the show to be held in the National Guard armory, Minneapolis, during the week of February 21-28 took place last week at the Minneapolis Automobile Club. Twenty-three representatives of local dealers took part in the drawing. Walter Wilmot will manage the exhibition.

Washington, D. C., dealers met at 1420 New York avenue on December 2 for the drawing for spaces at the show which is to be held in Convention Hall during the week of January 24. B. R. Johnson, of Baltimore, will be general manager of the show. The show will probably comprise an aeronautic section. The officers of the show committee are: W. C. Long, chairman; John S. Larcombe, Jr., secretary; John R. Thomas, treasurer.

The old Dealers' Association of Los Angeles, Cal., was dissolved a short time ago, and a new organization was formed at a meeting held in the office of Ralph C. Hamlin, a Franklin agent in Southern California, on December 2. The latter, however, does not include all of the dealers of the city, as may be inferred from the name adopted, viz., the Licensed Dealers' Association. At the organization meeting twenty-nine dealers were represented. The association is to be incorporated, and officers are to be elected at an early date.

The Philadelphia Automobile Trade Association held its annual meeting in the Odd Fellows Temple on December 7. The election of officers resulted as follows: J. A. Wister, president: H. B. Larzelere, vice president, and W. F. Foss, treasurer. The secretary's report shows that the association now has fifty-three members. A committee appointed some time ago to look into the advisability of adding club or social features to the program of the association made a verbal report, and will continue its work.

Garage Notes.

Pasadena, Cal.—The Nolan Garage, formerly the Union, has been remodeled. Charles L. Gardiner, formerly of the E. R. Thomas Motor Company, is superintendent; E. W. Eastman, former manager of the Glenwood Garage, at Riverside, is manager of the rental department, and Thomas Hopkins will have charge of the repair shop.

**San Bernardino, Cal.**—The building formerly occupied by Brazelton's stables on Third street is to be converted into a garage.

Hartford, Conn.—The Elmer Automobile Company, of 1100 Main street, will move to larger quarters in the Ashwell Garage at 341 Trumbull street. They handle the Ford car.

Washington, D. C.—J. W. Connelly has succeeded R. A. Klock as general manager of the Dupont Garage Company. Mr. Klock has associated himself with John V. Barross, under the firm name of Dupont Sales Company. They are agents for the Lozier, Columbia and Detroit electrics.

Pensacola, Fla.—Leslie E. Brooks and Herron D'Alemberte have let the comtract for a two story brick garage on West Garden street, between Baylen and Spring streets.

Atlanta, Ga.—The Maxwell-Briscoe Southern Company have moved to 832 Peachtree street, pending the erection of a permanent garage and repair shop.

Atlanta, Ga.—R. T. Peckham, formerly traveling salesman for the York Motor Car Company, has resigned to associate himself with Capt. G. V. Heidt, of the Pullman Auto Company, 10 Auburn avenue, agents for Pullman cars.

Twin Falls, Idaho.—Frank Belleville and F. C. Dawson, of the Western Automobile Company, have completed the construction of a 48x110 foot garage.

Twin Falls, Idaho.—L. A. Burson has purchased two lots on Shoshone street on which he will erect a \$6,000 garage. He will handle the Petrel car exclusively.

Chicago, III.—The Fiat Automobile Company has established a permanent branch here which will soon move into a new three story 70x150 foot building at 2347-53 Michigan avenue. The Chicago branch will be a central distributing point for the Middle West, and agencies will be established in all of the more important cities of that section.

Chicago, III.—F. Matthews has purchased a 49x196 foot lot on Michigan avenue and Thirty-sixth street, on which he will crect a garage and salesroom. Consideration, \$20.000.

Highland Park, III.—The Woods Motor Vehicle Company is installing a mod-

ern garage for the accommodation of patrons who live north of Evanston.

Kewanee, III.—Work has begun on a garage to be erected on Commercial street for W. T. Pierce and Wilbur H. Peterson, who will do a general automobile and repair business. The building will be ready for occupancy about the first of January.

Indianapolis, Ind.—The Studebaker Brothers Indianapolis Company have moved into their new salesroom and garage on North Pennsylvania street. The building has six stories, four of which are occupied by the Studebaker Company. Frank Staley, formerly vice president of the H. T. Hearsey Vehicle Company is manager.

Atlantic, Ia.—The Republic Motor Company, of Hamilton, Ohio, have let a contract for the erection of a concrete garage on the site of the old Hedges livery stable at Walnut and Fifth streets.

De Witt, Ia.—Lew Irwin is clearing ground for the erection of a 50x60 foot cement block garage.

Grinnell, Ia.—Charles Hink has taken over the garage on Main street operated by Robinson & Hink, Mr. Robinson having sold out his interest in the business.

Cheney, Kan.—A. B. McMirris & Son. of Ft. Scott, will open a garage here in the near future.

Salina, Kan.—F. W. Reed, of Salina. and P. D. Miller, of Lorraine, Kan., have formed a partnership and secured quarters at 131-33 North Fifth street, where they will open a garage and store about February 1. They will sell the Velie, Mason. Fuller and other lines, and conduct a general garage and repair business.

Owensboro, Ky.—The Carriage Woodstock Company broke ground last week for an addition to its plant which is to be used for the manufacture of automobiles. The company have already turned out two cars.

Athol, Mass.—George Brewer has purchased the Woodis carriage shop on Main street, which he will remodel as a garage. In the rear of the old building will be erected a structure for the storage of automobiles.

Boston, Mass.—Eugene N. Foss has begun the construction of a garage on Commonwealth avenue, near Beacon street.

Boston, Mass.—The local Maxwell branch, known as the Maxwell-Briscoe Boston Company, is now located in its new headquarters at the corner of Massachusetts avenue and Newbury street.

Haverhill, Mass.—The Hill Motor Car Company have leased the Empire Rink on Oak street, and will convert it into a garage.

Jamaica Plain, Mass.-The Martel

Motor Car Company has moved into its new quarters on Washington street.

Detroit, Mich.—A fire broke out in the garage in the rear of No. 60 Pingree avenue last week, badly damaging the building and destroying a new six cylinder Welch touring car, valued at \$6,400. The cause of the fire is unknown. Samuel Turner, chauffeur, who was working in the garage at the time, was badly burned about the face and hands.

Flint, Mich.—The garage of Harry Kanouse and a \$4,000 automobile stored therein were totally destroyed by a fire caused by the explosion of a gasoline tank.

Saginaw, Mich.—The Erd Motor Company will erect a \$12,000 building on Niagara street, between Mackinaw and Van Buren streets. It will be 150x50 feet, with two wings 36x40 feet.

Minneapolis, Minn.—The Mich-Stair Auto Company, now at Hennepin avenue and Ninth street, have closed a contract for the construction of a garage, salesroom and repair shop in the rear of the Knobloch Building with a frontage of 72½ feet on First avenue, and a depth of 65 feet on Eighth street.

Minneapolis, Minn.—B. E. Stimson, of the Maxwell-Briscoe Minneapolis Company, and Clarkson Lindley have closed a deal for the erection of a 47x125 foot, two story brick garage on Hennepin and Fifteenth streets, to be known as the Electric Garage, and to be operated by the Hathaway-Stimson Company. The Electric Garage Company are now occupying temporary quarters at 900 Hennepin avenue.

St. Louis, Mo.—Brown Brothers, agents for the Peerless and Detroit electric, will erect a three story 130x160 foot brick garage on the corner of Clarendon and Delmar avenues. When the building is completed the Park Automobile Company will occupy it, jointly with the owners. There will be a stone wall partition separating the two concerns, so that each company will have a showroom 65x160 feet. The building at present occupied by the Park Automobile Company, at 4432 Olive street, will be occupied by the Lindsay Motor Car Company, who handle the Interstate car.

St. Louis, Mo.—The Phœnix Auto Supply Company, 3932 Olive street, have opened a gas tank recharge station

Beatrice, Neb.—The Wheaton Automobile Company have moved into new quarters in the Kirkpatrick block, corner of Fifth and Ella streets.

Omaha, Neb.—C. F. Louk Company are constructing a garage and showrooms at 2050 Farnam street. The showrooms will be 20x50 feet, behind which will be a stock room and repair shop.

Omaha, Neb.—H. H. Van Brunt, of Council Bluffs, will erect a 50x100 feet garage on Farnum street.

Trenton, Neb.—The Taylor Motor Company have resumed work on their new garage, which was delayed some weeks on account of the snow.

Plainfield, N. J .- Much local opposi-

tion has developed to the granting of a permit to the F. L. C. Martin Automoabile Company for the installation of a 10,000 gallon gasoline tank on its property at 304 Park avenue. A public hearing on the matter was given by the common council on December 6, in which it was brought out that in New York city the limiting size of gasoline tanks permitted is 275 gallons; in Jersey City, 1,375 gallons; in Louisville, 250 gallons; San Francisco, 1,200 gallons; Knoxville, 210 gallons; Baltimore, 275 gallons, and Atlanta 200 gallons.

Buffalo, N. Y.—A permit has been been granted for the construction of a 66x100 foot garage for Miss Emma Brunemeyer, to be known as the Central Garage.

Gouverneur, N. Y.—A combined garage and amusement hall erected by A. S. Whitney, on John street, was opened to the public last week. The ground floor is laid in cement and will be used for the garage, while the upper floors are set apart for society events. The structure is of stone and marble.

New York, N. Y.—The Peerless Motor Car Company have opened a salesroom and offices at 1760 Broadway, near Fiftyseventh street.

Rochester, N. Y.—T. J. Northway has purchased lots 92 and 94 Exchange street, the property having a frontage of 54 feet and a depth of 138 feet, on which he will erect a \$35,000 garage and showrooms.

Columbus, Ohio.—C. W. Cain has leased rooms at Fourth and Spring streets, where he will open a garage. He has the agency for the American.

Columbus, Ohio.—The McDonald Automobile and Livery Company, recently incorporated to handle automobiles, will be the 1910 agents for the Buick line in Central Ohio. The announcement was made after J. A. Taft, George E. Bazler and P. F. Wilkinson returned from Cleveland. The concern, which is located at 1084 North High street, will have a large space at the coming automobile show. In addition it will handle the Welch-Detroit touring car.

Columbus, Ohio.—The Early Motor Car Company, of which Dr. L. M. Early is president, will open a salesroom near the corner of Town and High streets in a few days. The room will have a frontage of 40 feet on the principal street of the city. The company are Columbus agents for the Rambler and the Babcock electric. Douglass McCormick, well known in automobile circles, will be general manager.

Norwalk, Ohio.—The C. F. Jackson Company have purchased a site opposite the Avalon Hotel, on which they will erect a two story, 60x80 foot, fireproof garage. The building will be of brick and steel with concrete floors, and will be ready for occupancy about March I.

Dallas, Ore.—D. F. Harris has purchased the interest of his partner, Henry Stump, in the Dallas Garage.

La Grande, Ore.—D. A. Barnes has let the contract for a new garage.

Philadelphia, Pa.—Heary B. Leske has

reconveyed to John E. Hutchinson the garage property at 238-40 North Broad street, subject to a mortgage of \$65,000.

Philadelphia, Pa.—The Huntington Garage Company will erect a 90x90 foot garage at 1607-15 Huntington Park avenue.

Pittsburg, Pa.—The Morewood Garage has been opened at Center and Morewood avenues. A repair shop is conducted in connection with the garage.

Pittsburg, Pa.—McAllister Brothers Motor Car Company have purchased a 93x142 foot plot on Beatty and Baum streets, on which they will erect a garage and salesroom. They are at present located at Penn avenue, East End.

Houston, Tex.—The Auto and Motor Boat Company have let a contract for the erection of a two story garage on Milam street and Capitol avenue, at an estimated cost of \$10,000. Construction will begin at

Salt Lake City, Utah.—James H. Moyle has obtained a permit to build a two story brick garage at 121-125 State street, to cost \$50,000.

Beaver Dam, Wis.—The Silo Garage, 220 Front street, was badly damaged by fire last week. The loss is partly covered by insurance.

Milwaukee, Wis.—The Stevens-Duryea headquarters have been moved from Fourth and Prairie streets to 482 Milwaukee street. The Aikin Motor Car Company are State representatives for Wisconsin

Milwaukee, Wis.—The Studebaker Automobile Company, of South Bend, Ind., has established a branch here. The company has leased the entire first floor of the Colby-Abbot Building, Milwaukee and Mason streets, Milwaukee, and William F. Sanger has been appointed general manager. A temporary branch was located in the garage of the Sanger Automobile Company, at 572-574 Farwell avenue, several weeks ago. The Colby & Abbot Building is one of the largest and finest office buildings in Milwaukee. It was remodeled at a cost of \$75,000 only three years ago.

Sheboygan, Wis.—G. A. Wilke, who has conducted a garage and agency for several years on Jefferson avenue, is building a branch garage, to be devoted exclusively to his electric business, on Center avenue and North Seventh street. The old garage will handle all gasoline business. The new garage will be equipped with a complete recharging station.

Waukesha, Wis.—Schober Brothers & Co. are erecting a 40x90 foot, brick and stone, one story garage and repair shop.

### Pennsylvania Company Increases Capital,

The Pennsylvania Auto-Motor Company, of Bryn Mawr, Pa., have filed notice with the State Department at Harrisburg, Pa., of an increase in capital stock from \$300,000 to \$500,000.

### New Agencies.

BIRMINGHAM, ALA.-Speedwell Motor Car Agency, Speedwell,

BIRMINGHAM, ALA .- W. H. Johnston,

Rainier (for the State).
COALINGO, CAL.—Chrisman Brothers, Ford.
LOS ANGELES, CAL.—The H. O. Harrison

LOS ANGELES, CAL.-H. G. Carter, Speedwell.

OAKLAND, CAL .- The Keystone Garage, Patterson.

SACRAMENTO, CAL.-Hickman & Diggs Automobile Co., Speedwell.

SACRAMENTO, CAL.—The Lietch Draying

Co., Regal.
PENSACOLA, FLA.—Escambie Motor Car Co., East Garden street, Speedwell,

ATLANTA, GA .- The Buckeye Automobile Co., 621 Equitable Building, Ohio.

ATLANTA, GA .- H. H. Tift, Rainier (for the

SAVANNAH, GA .- Edward Moyle, 10 Broughton street East, Speedwell.

CHICAGO, ILL.—Centaur Motor Co., Rainier. CHICAGO, ILL.—The Hart Motor Car Co.,

JOLIET, ILL.—The Steinhart-Jensen Automobile Co., Economy.

PEORIA, ILL.—Hite D. Bowman, Rauch &

INDIANAPOLIS, IND .- Reliable Auto Exchange, 840 E. Washington street, Atterbury and Continental "35."

DES MOINES, IA.-Ideal Auto Co., Overland. LOUISVILLE, KY .- The Atlas Machine Co., 735 West Market street, Marmon.

NEW ORLEANS, LA.—Gentilly Automobile Co., 216 Barrone street, Speedwell.

DIXFIELD, ME .- The Orchard Garage, Mitchell.

FORT FAIRFIELD, ME.-H. G. Richards,

BALTIMORE, MD.—The McMullen Garage Automobile Co., 542 Tyson street, Stearns. DETROIT, MICH.—Gilmour & Fear, Krit car.

DETROIT, MICH.—The Neal-Ketchell Motor Sales Co., De Tamble.

MANKATO, MINN .-- C. H. Saulpaugh, Stude-

MONTICELLO, MINN .- Geo. H. Allen, Overland (for Stearns County).
SLAYTON, MINN.—Hans Paulson (for the

county), Brush runabout. KANSAS CITY, MO .- The Kansas Auto Top

& Supplies Co., Mitchell. ST. LOUIS, MO.—Oscar Stroh, 5021 Cabanne

street. Broc electric. OMAHA, NEB .- Capron-Wright Automobile Co.,

Speedwell. OMAHA, NEB .- The McIntyre Auto Co., Oak-

land. OMAHA, NEB .- Edholm & Peters, Chase.

OMAHA, NEB .- The Auto Sales Co., 1824 Farnam street, Gaeth. TRENTON, N. J.—Chalmers-Fanning Motor

Co., Mercer. ALBANY, N. Y .-- C. W. Weeber Manufactur-

ing Co., 170 Central street, Haynes and Ford.
NEW YORK CITY, N. Y.—Harry Houpt,

Sixty-fifth street, Ohio. SCHENECTADY, N. Y .- Arthur J. White and

Thomas B. Tillott, Jr., Jackson. DRAYTON, N. DAK .- Moore & Lean, Studebaker.

CLEVELAND, OHIO .- Harry S. Moore, Na-

tional, Courier and Stoddard-Dayton. CLEVELAND, OHIO.—The Vail Motor Car Co., Empire.

COLUMBUS, OHIO.-The Columbus Garage & Machine Co., 41 West Mound street, Empire (for central Ohio).

BAKER CITY, ORE,-E. M. Chandler, White, HOOD RIVER, ORE .- Stewart Hardware Co.,

PORTLAND, ORE .- The Western Auto Car Co., 531 Alder street, Knox.

PORTLAND, ORE .- Cuthbert & Smithsen, Studebaker.

PORTLAND, ORE .- Apex Bicycle Co., "Thor"

PORTLAND, ORE .- The Willamette Auto and Supply Co., McIntyre,

PORTLAND, ORE.—Gumpert & McCroskey, 531 Alder street, Regal.
SALEM, ORE.—The Cherry City Automobile

Co., Rambler, McKEESPORT. PA .- The Studebaker Motor

Sales Company, Studebaker.
PHILADELPHIA, PA.—Henry Petri, South

Camac street. Black Crow. PHILADELPHIA, PA .- Stoddard-Dayton Auto

Co., Courier car. PHILADELPHIA, PA .- Frank Fanning, Mer-

BRISTOL, S. DAK .- Ike Foltz, Brush.

ABILENE, TEX.—T. W. Simpson, Speedwell. HOUSTON, TEX.—Houston Electric Appliance Co., 628 First National Bank Building, Speedwell. HOUSTON, TEX.—J. M. Barber, Velie, HOUSTON, TEX.—George W. Beardsley, Texas

avenue, Moline.
SAN ANTONIO, TEX.—Independent Auto Co.,

Franklin. SEATTLE, WASH .- Racine Auto & Boat Co..

Speedwell. LYNCHBURG, VA.-W. W. Lynn, Speedwell. RICHMOND, VA .- J. B. Alsop, 202 South

Third street, Speedwell.
SEATTLE, WASH.—E. M. Biehl, 1111 Amer-

ican Bank Building, Middleby.
EAU CLAIRE, WIS.—The Tanberg Auto Co., Overland.

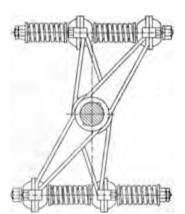
ELKHORN, WIS.-Zwiebel & Griebel, Buick, LA CROSSE, WIS .- The Tanberg Auto Co.,

PORTAGE, WIS .- Geo. Bremmer, Mitchell. SUPERIOR, WIS .- The Superior Motor & Machine Works, Ford (for northwestern Wisconsin).

### The James & Browne Spring Drive.

This old established British firm, located at London, have recently brought out a 5 ton truck fitted with a novel spring drive, a description of which we take from the Commercial Motor.

As shown by the drawing, cast steel arms bear on their extremities spherical sock-



The "J. and B." spring drive.

ets, which carry adjustable spindles, and these, by means of strong square section helical springs, serve to keep the arms apart at a definite distance until such time as shocks, through unreasonable use of the clutch or brakes, are to be transmitted through the driving gear.

### No German Show in 1910.

The German Automobile Manufacturers' Association, in session at Berlin on December 1, decided not to hold an automobile

show in Berlin or elsewhere in Germany during 1910, and not to take part in the several small shows (Leipsic, Frankfort, Bremen) which are to be held next year. The question of exhibiting at foreign shows was brought up, and it was decided not to restrict members in this respect. A committee of seven members was appointed to devise ways and means to overcome the commission evil, which is said to have become very acute since the going into effect of the new law concerning unfair competition, with its "graft" provision.

### Number of Automobiles in Great Britain.

The Royal A. C. of Great Britain and Ireland has just compiled from the registration figures of the different counties throughout the United Kingdom the number of cars of various kinds registered in that country during the year which ended September 30, 1909. The following table shows these figures, together with the figures for the previous year and the increase in each item:

			-Increase.		
			Num-	Per	
	1908.	1909.	ber.	Cent	
Private motor cars.	71,405	84,840	13.435	18.8	
Trade motor cars	12,104	15,181	3.077	25.4	
Public service cars.	5,880	8,752	2.870	48.8	
Total cars	89.389	108,773	19,384	21.7	
Motor cycles	65,026	75,000	9-974	15.3	

Grand total....154,415 183,773 29,358 19.0 The above figures show clearly the trend of the industry in the direction of commercial applications. The heavy increase in public service vehicles is particularly noticeable. Drivers' licenses were issued to the number of 148.974 in 1908 and 174.986 in 700), an increase of 17.5 per cent.

### New Two Cycle Motor.

George Holloway, of Sandusky, Ohio, formerly superintendent of the Elmore Manufacturing Company's plant. has brought out and will place on the market a new two cycle engine, which will be built both in automobile and marine types. The engine is claimed to give more power for given cylinder dimensions than is obtainable from the conventional construction. A two cylinder motor of 4 inch bore and 4 inch stroke is said to have developed 17 horse power on the brake. The engine differs from other engines operating on the two cycle principle in that there are two separate sets of intake pipes and ports leading to the crank case. For ordinary speeds of operation only one oi these sets is used, but when extreme speed or power is desired, both sets of passages are thrown in operation, whereby a more complete charge is taken into the crank case. Patents on the construction have been applied for in this country and abroad.

The Valley Falls (R. I.) Fire District, at a meeting held on December 6, voted to purchase a motor propelled fire truck, which will probably be the first motor propelled fire apparatus in the State.

# NOTES OF THE INDUSTRY AND THE SPORT.

The Dixie Motor Works, Jackson, Tenn., are erecting a 40x100 foot building on Poplar street, which will be ready for occupancy about the first of the year.

L. J. Kaestner, of Plymouth, Wis., and the Holloway Automobile Company, of Monroe, Wis., are establishing automobile repair shops at this time.

The firm of Carpenter & Volkhardt, manufacturers of storage batteries at 2441 Michigan avenue, Chicago, has dissolved partnership. J. M. Volkhardt will continue the business.

The Olds Motor Works, of Lansing, Mich., are reported to be employing 1,054 men at the present time. The plans for next year call for 1,500 four cylinder cars and 500 six cylinder.

The list of exhibitors at the Madison Square Garden Show, printed elsewhere in this issue, shows a total of 323 different displays, of which 54 are exhibits of complete cars, 23 of motorcycles and 246 of accessories and parts.

The Reliance Motor Truck Company, of Owosso, Mich., have secured a tract of about 20 acres on which it is planned to erect a new building early in 1910. The capacity of the company will be doubled when this plant is completed.

The Chicago Auto Top Company has been organized to manufacture automobile tops, dust hoods, slip covers and trimmings, and has secured a factory and office at 1507 Michigan avenue. A repair department will be connected with the plant.

The Imperial Automobile Company, of Jackson, Mich., for whom a four story, 102x 132 foot factory building is at present being erected on East Washington street, plan to turn out three models for next year at \$1,350, \$1,650 and \$2,000, respectively.

The Colburn Automobile Company, who have been building automobiles in Denver, Col., in a small way for some years, have decided upon the erection of a \$60,000 factory and an output of 500 cars for next year. The factory will probably be located near Overland Park.

The Badger Brass Company, Kenosha, Wis., have added several new wings to their building, giving them considerably more floor space and enabling them to enlarge their output to an appreciable extent. They are also negotiating for the purchase of other properties adjoining their present site to still further enlarge their plant.

The Maxwell-Briscoe Motor Company, Tarrytown, N. Y., have added one more model to their 1910 line, known as the "Q 4 Sportsman." This car was originally built for the use of the company's various branch houses for competition in local races, hill climbs and endurance runs. It appealed to a large number of buyers, however, and was therefore included in the regular line

for next year. Its specifications are the same as those of the other two models recently described in these columns, and the price is \$1,000.

The Standard Connecting Rod Company, Beaver Falls, Pa., have purchased a number of properties in the vicinity of their factory, and will erect an addition to their plant.

The Hartford Rubber Works Company, of Hartford, Conn., have leased a building at 709 East Fifteenth street, Kansas City, Mo., where they will open a branch distributing house for the entire West.

The Western branch of the Willard Storage Battery Company will be moved on December 15 to 320 Dearborn street, where a complete line of storage batteries and supplies will be kept on hand and repair facilities be installed.

The Remy Electric Company, Anderson, Ind., have established a branch distributing office at San Francisco, Cal., where a full line of their magnetos, fittings and parts will be carried in stock. The branch is located at 170 Golden Gate avenue.

The Rushmore Dynamo Works have recently placed agencies for the sale of their lamps and generators in Berlin, St. Petersburg, Riga and Christiania. They have also opened branch stores in No. 1 Crow street, Dublin, and 33 Victoria Building, Deansgate, Manchester.

According to newspaper dispatches from Los Angeles, Cal., plans are maturing there for the construction of a saucer shaped motordrome, with a track built of heavy timbers and planked with finished lumber. The banking all the way around will be calculated to permit of speeds of 2 miles per minute

The "Simplex" oil and grease injector, invented by Raymond C. Agner, of Burlington, Wis., will be produced on an extensive scale, now that patents have been obtained. The Raymond C. Agner Company, recently organized to manufacture the device, intends to build a factory at Burlington early next year.

According to the latest announcement of the Maxwell-Briscoe Motor Company, they will manufacture 16,000 cars at their four plants. The 30 horse power cars are produced at Kingsland Point, N. Y.; the 22 horse power cars at Providence, R. I., and the 12 horse power runabouts at Newcastle, Ind. The bodies, wheels and fittings come from the Tarrytown factory.

The Belmont Automobile Company, a New York corporation, have secured a factory at 1040 State street, New Haven, Conn. The car to be built will be known as the Belmont 30, and will be made in baby tonneau and five passenger touring car types. The company has been operating in New York for about a year. The officers are:

C. B. Tyler, president; A. L. Kull and Douglas Hamilton.

Waterhouse & Lester, San Francisco, Cal., are inaugurating a motor supply department in charge of Eugene De Prez, formerly with the Neustadt Company.

The Cream City Trimming Company, manufacturer of automobile tops, Milwaukee, Wis., are erecting a new plant at 613-615 Market street, in Milwaukee.

The Boston, Mass., branch of the Columbia Lubricants Company, manufacturers of Monogram oils, has removed from 35 Hartford street to new, spacious quarters at 1000 Boylston street.

The Duplex Coil Company, of Fond du Lac, Wis., are preparing to build a large addition, following the decision of the directors to manufacture and market a new type of magneto under the "Duplex" trade mark. The new line will be taken up on January 15.

The first motor truck produced by the Schaefer Company, of Berlin, Wis., is now undergoing exhaustive tests. The company recently awarded contracts for an addition to its machine shops and foundry, doubling the capacity in order to take up the manufacture of trucks,

The Fourth Annual Pittsburg Automobile Show will be held at Duquesne Garden, March 26 to April 2, 1910, under the auspices of the Automobile Dealers' Association of Pittsburg, Inc. The show committee consists of Frank D. Saupp, chairman; G. P. Moore and James R. Newell.

The General Motors Company have bought an extensive tract of land in Detroit, Mich., on which they plan to erect a parts factory, and have approached the city council with the request to close certain streets and alleys running through the property. The matter has been referred by the council to the joint committee on streets and street openings.

Capitalists of Rochester, N. Y., held a meeting in the Masonic Club Rooms, on December 6 to consider a plan for organizing a stock company to manufacture automobiles. About \$20,000 worth of stock was subscribed for, and a date for another meeting this week was set. The plan is said to be the outcome of a proposition from a newly organized Detroit company to locate in Rochester, which proposition was turned down by Rochester interests.

Citizens of Greenfield, Ind., are attempting to secure the factory of the Leader Automobile Company, now located at Knightstown. The company was formerly known as the Columbia Electric Company, and manufactures a line of gasoline cars. Luther R. Frost, manager and one of the heaviest stockholders in the company, lives in Greenfield, and has stated that it citizens of that

city will subscribe for sufficient stock the factory will be moved.

Business men of Port Arthur, Tex., are considering a plan to establish an automobile factory in that city. J. Ormrod, a promoter, of Houston, is interesting local capitalists in the plan.

The Baldwin Chain and Manufacturing Company, of Worcester, Mass., are erecting a building at the rear of their present factory at 199 Chandler street, which will give them 10,000 square feet additional floor space. The building will be ready for occupancy on January 1.

Albert Schenk, of Wheeling, W. Va., has invented a non-skid device said to be particularly applicable to motor trucks, and is now planning to organize the Packers Auto Truck Company, which will be incorporated with a capital stock of \$1,000,000, under West Virginia laws and will locate in Pittsburg.

The Jackson Automobile Company, of Jackson, Mich., recently completed four new factory buildings. The largest building is a three story structure, 227x60 feet, and will be used entirely for body construction. Another three story building, measuring 145x60 feet, will be used for the painting and finishing department, and the third building, two stories high and measuring 200x60 feet, will form an addition to the machine shop. The fourth building is a one story structure, 100x60 feet, and will be used as a testing room. The total floor space of these four buildings is 120,000 square feet.

#### Club Notes.

The Wyoming Motor Cycle Club was organized at Cheyenne on November 30, with the following officers: W. S. Lee, president; W. A. Wilson, vice president; Fred Boyer, secretary, and E. B. Love, treasurer. The club plans to affiliate with the Federation of American Motor Cyclists.

The Baton Rouge (La.) A. A. was organized at a recent meeting in the office of Dr. Charles McVea, with the following temporary officers: Dr. Chas. McVea, president; W. M. Barrow, secretary. Resolutions were adopted endorsing the ordinance recently passed by the city council regulating the speed of automobiles.

The Quincy (Ill.) A. C. at a meeting held at the Newcombe Hotel on December 6 passed a resolution urging the city authorities to immediately start work on the improvement of the paved streets, in both the business and residence sections, and not to permit tearing up the streets without exacting proper guarantees that the pavement will be relaid in a proper manner.

The Wilkes-Barre (Pa.) A. C. at a meeting held on December 3 received the resignation of President James H. Hughes, and decided to henceforth hold their annual election in January instead of in April. The committee in charge of last year's hill climb made a report showing that the receipts amounted to \$3,771.13, and the expenditures

to \$4,442.42. The difference is to be paid out of the club's treasury.

The touring cup presented to the Long Island A. C., by D. C. Lefferts, has been awarded to Wm. C. Wintringham, who toured in thirteen different States during the past year.

The A. C. of New Rochelle, N. Y., has adopted resolutions condemning the action of Policeman Arthur Sutton, of White Plains, N. Y., in shooting at the automobile of Harvey Husted, of White Plains, in North avenue. The resolution was forwarded to the police commissioners of White Plains, and a hearing will be given Sutton on December 13.

The Dayton (Ohio) A. C. was organized at a meeting held at the Algonquin Hotel on November 30, and will affiliate with the Ohio State A. A. According to the resignation records, there are 725 automobile owners in the city, but only fifty joined the club as charter members. Carroll D. Sprague was elected temporary president, and an election of permanent officers will be held in the near future.

The automobile drivers of Spokane, Wash., have recently organized under the name of the Spokane Chauffeurs' Club, the following officers being elected: Tom W. Evans, president; John A. Halstead, treasurer; Harry R. Anderson, secretary. It was determined at the meeting that only men who have had at least two years' road experience as drivers and can pass a rigid automobile machinist's examination shall be eligible as members of the club.

The Mt. Vernon (N. Y.) A. C. held its annual meeting on December 6. E. H. Patterson talked on his experiences in motoring in this country and abroad. The following officers were elected: Wm. H. Mendell, president; Chas. B. Philips, vice president; L. A. Kissling, recording secretary; Otto F. Rost, financial secretary, and Anthony H. Seitz, treasurer. The new officers will be installed at a meeting to be held on January 7.

The Chicago Motor Club held its annual election at the new Southern Hotel on December 7. The following officers were elected: David Beecroft, president; Thos. J. Hay, first vice president; Louis Geyler, second vice president; F. H. Trego, secretary, and H. T. Clinton, treasurer. The new directors of the club plan to reduce the annual dues from \$12 to \$5, to enlarge the club headquarters and to co-operate with the automobile clubs in the State in the interest of better legislation and good roads.

Racing Notes.

It is reported that the Manufacturers' Contest Association has received requests for sanctions for 110 different race meets for next season.

The Century Motor Club, of Philadelphia, will hold a road-ability run from Philadelphia to Wilmington, Del., and back on New Year's day. The outward route will be by way of Westchester and Oxford, and the return route will lead through Chester,

Media, Phœnixville, Norristown and Doylestown. Checkers will be stationed in each town.

In the account of the Edgewater-Fort Lee hill climb, in our last issue, Chapple's time on an Indian motorcycle was given as 0:50.15, but which according to the official time record was 1:02.18.

The latest automobile track project is reported from Lincoln, Neb., where J. A. Buckstaff is planning to build a 4½ mile track around Capital Beach Lake, as close to the shore of the lake as possible.

According to W. J. Morgan, who has been the promoter of the Ormond-Daytona Beach races in past years, these races will not be held the present winter, as they have not been financially successful in recent years.

The Quaker City Motor Club, of Philadelphia, has abandoned its annual midwinter endurance run, which was to be held on December 29-30. The decision was arrived at as the result of the inclement weather during last year's run.

The entries for the French Grand Prix for 1910 closed on November 30. Only thirty-six entries were received, and as the committee in charge deems forty-five necessary in order to justify the organization of the race, it is very likely that the classic event will not be held next year.

The Chicago Motor Club plans to hold record trials on a one mile straightaway course in the vicinity of that city some time during Christmas week, if the weather permits. C. E. Gregory and E. A. Hearn have been appointed a committee to select a suitable course. Lewis Strang and E. A. Hearn will attempt to break the world's records in the big Fiat racer recently imported into this country and a Fiat stock car respectively.

#### New Incorporations.

The Iowa Motor Truck Company, Des Moines, Ia.—Capital stock, \$25,000. Incorporators, P. E. Coffee and others.

The Brady Auto Company, Austin, Tex.—Capital stock, \$20,000. Incorporators, D. F. Savage, W. D. Crothers and J. E. Thompson.

Magnolia Motor Company, Houston, Tex.—Capital stock, \$10,000. Incorporators, James L. Autrey, W. B. Sharp, G. R. Spotts and others.

The Apperson Motor Car Company of Chicago, Chicago, Ill.—Capital stock, \$2,500. Incorporators, Elmer Apperson, E. L. Apperson and Alton G. Seeberling.

The Nyberg Auto Company, Dover, Del.—Capital stock, \$150,000. Incorporators, Eric Kulberger, F. G. W. Steiber and E. W. Jenkins, all of Chicago, Ill.

The Gentilly Automobile Company, New Orleans, La.—Capital stock, \$30,000. Incorporators, R. E. Edgar de Monthuzzin, M. A. Baccich and Ed. L. Lafaye.

The Texas Automobile Association, Houston, Tex.—No capital stock. Incorporators, Capt. J. W. Munn, of Galveston;

G. W. Hawkins, E. J. Keist, of Houston,

The R. L. Morgan Company, Worcester, Mass.—Capital increased to \$1,000,000.

Reynolds Motor Company, Detroit, Mich. -Capital stock, \$40,000. Incorporators, A. Reynolds and others.

The West Motor Car Company, Wilmington, Ohio.-Capital stock, \$10,000. Incorporators, James M. West and others.

The Waco Auto and Supply Company, Waco, Tex.-Capital stock, \$7,000, Incorporators, Geo. Roper, Jr. and B. A. Hayes.

The American Motor and Supply Company, Shelby, Ohio.-Capital stock, \$25,000. Incorporated by J. W. Williams and others.

The Highland Garage, Tarrytown, N. Y. -Capital stock, \$10,000. Incorporators, D. S. McElroy, Jr., James Bailey and Chas.

The White Auto Company, Enid, Tex .-Capital stock, \$100,000. Incorporators, R. Kennedy, J. R. Clover, J. R. Dunworth and H. E. Louthan.

The Light Motor Wagon Company, Milwaukee, Wis.-Capital stock, \$10,000. Incorporators, B. E. Malone, O. R. Kaddatz and H. A. Richards.

The East Side Automobile Company, Portland, Ore.-Capital stock, \$10,000. Incorporators, Alma Williams, James Mitchell and J. H. Williams.

The Washington Taxicab Company, Spokane, Wash.-Capital stock, \$200,000. Incorporators, A. E. Gallagher, Nathan Toklas and Harry I. Broh.

The Acme Auto Wind Shield and Top Company, Indianapolis, Ind.—Capital stock, \$5,000. Incorporators, O. H. Rogers, J. L. Burch and J. E. Sickels.

The Auto Wheel Company, Lansing, Mich.-Capital stock, \$150,000. Incorporators, E. S. Porter, H. E. Bradner, H. T. Campbell, J. C. Watzell, Lawrence Price, F. E. Platt and Jacob Gansley.

The Tri-State Auto and Machine Company, Keokuk, Ia.-Capital stock, \$10,000. Incorporators, R. B. Meek, J. T. Erickson, E. A. Larson and A. E. Erickson.

The Fisher Automobile Company, Cherokee, Okla.-Capital stock, \$5,000. Incorporators, A. H. Stout, F. J. Salisbury, John W. Pickrell and George Salisbury.

The Nielson Motor Car Company, Detroit, Mich.-Capital stock, \$50,000. Incorporators, Charles J. Woodward, Benj. A. Welstead and Edward L. Webb.

The Albemarle Rapid Motor Transfer Company (Inc.), Charlottesville, Va.-Capital stock increased from \$5,000 to \$25,000. To conduct an automobile business.

The Gillespie Auto Sales Company, Detroit, Mich.-Capital stock, \$25,000. Incorporators, John Gillespie, D. P. Markey, D. H. Gillespie and Ralph S. Merriam.

The Enterprise Machine and Garage Company, Franklin, Ky.-Capital stock, \$10,000. Incorporators, W. H. Windfield, H. M. Mullinx, J. O. Turner and B. Harris.

The American Auto Company, Columbus, Ohio.-Capital stock, \$3,000. Incorporators, William Bucher, C. W. Cain, Laura

The White Auto Company of Enid, Okla. -Capital stock, \$10,000. Incorporators, R. Kennedy, William Kennedy and J. R.

The Stutz Auto Parts Company, Indianapolis, Ind.-Capital stock, \$10,000. Incorporators, H. F. Campbell, H. C. Stutz and C. E. Stutz.

Twin City Motor Car Company, St. Paul, Minn.-Capital stock, \$200,000. Incorporators, Fred Joerns, Wm. Thiem and Edward A. Thiem.

The Standard Automobile Company, Wheeling, W. Va.-Capital stock, \$25,000. Incorporators, E. J. Becker, Geo. W. Row, C. E. Morris, H. L. Arbenz and Albert L. Lohm.

The Stafford Motor Car Company, Kansas City, Mo.-Capital stock, \$100,000. Incorporators, Terry Stafford, C. L. Merry, W. G. Whitcomb, C. E. Hoefer and F. C. Merry.

The Syracuse Specialty Company, Syracuse, N. Y.-Capital stock, \$10,000. Incorporators, Duncan W. Peck, W. D. Hawley and Thomas H. Harvey. To manufacture motors, etc.

The Enterprise Garage Company, Brooklyn, N. Y .- Capital stock, \$25,000. Incorporators, F. A. Sands and Neil Campbell, of Brooklyn, and J. Robert Rubin, of Manhattan.

The Standard Motor Car Company, Wheeling, W. Va.-Capital stock, \$25,000. Incorporators, Thomas W. Norton, J. F. Ranson, Frank O'Brien, E. E. Shaffer and George A. Blackford.

The Andrew Motor Company, Newcastle, Ind.-Capital stock, \$3,000. Incorporators, J. D. Smith, H. E. Jennings, H. C. Yauky, W. C. Bond, H. F. Burk, D. W. Kinsey and H. C. Chase.

#### Trade Personals.

George E. Sherman has been appointed advertising manager of the Holsman Automobile Company, Monadnock Building, Chicago, Ill.

E. S. Leonard, formerly in charge of the Ajax tire branch in Portland, has been transferred to Seattle, where he will look after the sales of the Seattle office.

A. C. Stevens, for the past year superintendent of the Seattle Taxicab Company, has severed his connection with that company, and has secured the agency for the Stearns car in Seattle, Wash.

C. G. Wridgway, who was formerly manager of the Peerless branch in this city, has returned from Europe, where he went after resigning from that position, and states that he plans to engage in the business of exporting American cars.

F. R. Bump, sales manager of the H. H. Franklin Manufacturing Company, has returned from a two weeks' trip through the South. On his journey he visited Franklin motor car dealers in Jacksonville, Fla.; Savannah, Ga.; Atlanta, Ga.; Green-

B. Levering, W. S. Siebert and J. H. ville, S. C.; Charlotte, N. C.; Richmond, Va.; Washington, D. C.; Baltimore, Md., and Philadelphia, Pa.

A. H. Whiting, manager of the New York branch of the Dayton Motor Car Company for the past several years, has severed his connection with that company.

Frank Fanning, formerly a member of the Chalmers-Fanning Motor Company, of Philadelphia, Pa., has been appointed manager of the Philadelphia agency for the Mercer car, made in Trenton, N. J.

William R. Everitt, formerly president of the Sterling Machine Works, Sterling, Ill., has been appointed vice president and secretary of the Nyberg Automobile Works, 2437 Michigan avenue, Chicago.

W. J. Mead, formerly connected with the Buick branch in Chicago, is now secretary and general manager of the Olds Motor Works, Lansing, Mich.; he is also vice president of the General Motors Company.

Harry E. Fields, vice president of the Hartford Rubber Company, has started on a Western trip, in the course of which he will visit Denver, Los Angeles, San Francisco and Seattle. He will return about Christmas.

Robert Pierpont has succeeded R. R. Owen as factory manager at the plant of the Olds Motor Works, Lansing, Mich. Mr. Pierpont has been connected with the Buick Company at its Flint and Jackson plants for a number of years.

Thomas F. Smith, of Chicago, has been appointed general manager of the new Milwaukee branch of the Studebaker Automobile Company, in the Colby-Abbott Building. William F. Sanger, of the Sanger Automobile Company, is sales manager.

#### Stearns Wins Los Angeles Six Hour Race.

A Stearns car driven by Soules won the six hour race at Ascot Park, Los Angeles, on December 13, covering 293 miles. A Pullman, driven by George Kussman, was second, with 251 miles, and a Buick was third, with 249 miles. The event was marred by numerous accidents to cars and serious injuries to participants. In the fifty-second mile the Apperson Jack Rabbit, with Harris Hanshue at the wheel, turned over three times on a sharp turn. Neither Hanshue nor his mechanician was injured.

The Cadillac and Sunset also overturned at the same spot.

The Philadelphia Automobile Company have decreased their capital stock from \$20,-000 to \$5,000.

How widespread technical interest and experimentation in the navigation of the air are becoming is shown by a statement of the H. H. Franklin Manufacturing Company of Syracuse, maker of the Franklin automobile. That company is receiving on an average two inquiries a week regarding the availability of the Franklin air cooled engine for use in aviation.

### MOTOR VEHICLE PATENTS.

Patents Issued September 14, 1909.

933,735. Roller Bearing.—Lincoln J. Aldridge, Plattaburg, N. Y., assignor to Aldridge Roller Bearing Manufacturing Co., a corporation of New York. Filed January 5, 1909.

933,748. Tire Protector .- Dufferin Day, Hume,

Ohio. Filed May 11, 1908. 933,807. Spring Wheel.—Henry J. Wildhagen, Palatine, Ill. Filed September 1, 1908.

933,868. Combined Press and Vulcanizer. K. Williams, Akron, Ohio, assignor of one-half to the Williams Foundry and Machine Co., a corporation of Ohio. Filed January 17, 1908.

933,870. Change Speed Gearing.—Austin M. Wolf, New York, N. Y. Filed November 13, 1908. y33,877. Oil Can.—Robert H. Booth, Monmouth, Ill. Filed April 17, 1909.

933,960. Internal Combustion Engine.-David H. Coles, Brooklyn, N. Y. Filed October 16, 1908. 933,997. Suspension Spring System for Automobiles.—Charles A. Lieb, New York, N. Y. Filed

December 3, 1908. 934,016. Transmission Gear for Automobiles and Other Machinery.-Lewis T. Rhoades, Phoenixville, Pa. Filed January 3, 1908.

Coupling for Power Transmission in 934.043. Motor Vehicles.-Howard E, Coffin, Detroit, Mich., assignor to Chalmers-Detroit Motor Co., Detroit, Mich., a corporation of Michigan. Filed November 6, 1908.

934,067. Front Axle Connection for Vehicles.— Arthur J. Goyette, Springfield, Mass., assignor to Thomas E. Daly, Springfield, Mass. Filed July 30, 1908.

934,117. Drive Gear for Motor Vehicles.—John . Welton, Canal Dover, Ohio. Filed October 28. 1908.

934,144. Steering Gear for Vehicles.—Eugene N. Daniels, La Fargeville, N. Y. Filed June 12, 1008.

934,159. Spring Wheel.-Fred N. Gibb, Little

934,164. Adjustable Crank for Internal Combustion Engines.—Conrad J. Gotti, Tuckahoe, N. Y. Filed February 16, 1909.

Vehicle Wheel.-Lewis Inglee and 934,178. Charles M. Hart, Amityville, N. Y. Filed August 12. 1008.

934,187. Detachable Wheel Rim .- Carl Kindscherf, Hanover, Germany, assigner to the firm of Continental Caoutchouc and Gutta Percha Compagnie, Hanover, Germany. Filed June 30, 1908. 934,238. Cultivator (Motor Propelled).—Nathan

Tripp, Grand Rapids, Mich. Filed December 2, 1908.

014.264. Friction Clutch Mechanism for Automobiles and for Other Applications.-Alberto Balloca, Turin, Italy, assignor to Company Itala, Fabbrica di Automobili, Turin, Italy. Filed January

Wheel for Road Vehicles.-Glencairn S. Ogilvie, Woodbridge, England. Filed June 28, 1007.

934,348. Chain Tightener.-Charles H. Peterson, Westbrook, Me. Filed March 6, 1909.

934,416. Wheel for Motor Cars, Etc.—Glencairn S. Ogilvie, Woodbridge, England. Original application filed August 3, 1903, Serial No. 168,094. Divided and this application filed June 28, 1904.

#### Patents Issued September 21.

934,425. Braking Mechanism.—James P. Callahan, Chicago, Ill. Filed February 8, 1909.

934,427. Spark Plug for Gas Engines .- David H. Coles, Brooklyn, N. Y. Filed March 20, 1909. 934,461. Tire Tool.-Herbert J. Phillips, Bays-

water, London, England. Filed June 24, 1908. 934,505. Change Speed Gearing.—Charles Cotta, Rockford, Ill., assignor to Cotta Transmission Co., Inc., Rockford, Ill. Filed June 7, 1906.

934,547. Braking Means for Automobile Ve-

hicles.-Arthur Krebs, Paris, France, assignor to La Société Anonyme des Anciens Etablissements Panhard et Levassor, Paris, France. Filed February 15, 1908.

Radiator for Automobiles. Todd, Chicago, Ill., assignor to Joseph B. Long, Chicago, Ill. Filed August 30, 1907.

934.597. Clutch for Concentric Rotary Parts.— Frederick S. Ellett, Elmira, N. Y. Filed June 7,

934,621. Roller Bearing.-John Newmann, Brooklyn, N. Y. Filed April 15, 1909.

934,639. Tire.-Victor E. Van Cantfort, Akron, Ohio. Filed April 18, 1908.

Valve Reseating Tool.—Thomas B. 934,642. Williams, Orange, Mass., assignor to the Leavitt Machine Company, Orange, Mass. Filed March 12, 1909.

Crank Case for Engines.-- John P. 934.675. Landgraf, Mishawaka, Ind. Filed April 17, 1909. 934,680. Protecting Device for Explosion Engines .- Julius Lengel, West Philadelphia, Pa. Filed December 9, 1908.

934,685. Propelling Gear for Trucks.-George A. Mickelson, Spokane, Wash. Filed April 20, 1909.

Spark Distributor .- Edouard Denie-034.715. port, Paris, France. Filed September 30, 1908.

934,716. Variable Speed and Reversing Gear.— Frank W. Dodd, Rodwell, Weymouth, England. Filed April 24, 1908.

934,750. Valve Gear .- Thomas O'Brien. New York, N. Y. Filed February 24, 1908. 934,762. Valve Gear for Descending Automo-

biles.-Hippolyt Saurer, Arbon, Switzerland. Filed August 28, 1905.

934,842. Sparker Mechanism for Internal Combustion Engines.—Henry Schaake and John T. Cowie, New Westminster, British Columbia, Canada. Filed July 27, 1908.

934,912. Hauling Motor.-Harold A. Heavey, Paskenta, Cal. Filed November 26, 1906.

934,925. Wheel Guard.—George W. Mahan, Cold Spring Harbor, N. Y. Filed November 19, 1908.

934,978. Sparking Mechanism.-Roy C. Marks, San Diego, Cal., assignor of one-eighth to R. H. Gunnis, one-eighth to Oliver J. Winston, and oneeighth to W. W. Whitson, San Diego, Cal. Original application filed September 12, 1906. Serial No. 334,327. Divided and this application filed February 6, 1908.

#### Patents Issued September 28, 1909.

935,033. Vehicle Tire.-Clinton H. Knecht. Akron, Ohio. Filed August 26, 1908.

Variable Transmission Gear .- Johann 935,034. Knecht, Chemnitz, Germany. Filed September 8, 1908.

935,036. Gear Casing for Motor Vehicles.— John C. Lott, Columbia, S. C. Filed June 18,

Valve.-Lenn G. McCorry, Carbon

Center, Pa. Filed January 12, 1909. 935,048. Coupling for the Inflating Valves of Pneumatic Tires.—Charles McNellis, Chicago, Ill. Filed October 3, 1908.

935,108. Automobile Safety Appliance.—Mortimer A. Howe, Tacoma, Wash. Filed February 15,

935,190. Wind Screen.—Edwin K. Conover, Paterson, N. J., assignor, by mesne assignments, to C. A. Mezger, Incorporated, Brooklyn, N. Y., a corporation of New York. Filed November 26, 1907.

935,211. Motor Vehicle.-Allen Loomis, Detroit, Mich., assignor to Packard Motor Car Co., Detroit, Mich., a corporation of West Virginia. Filed January 2, 1908.

935,252. Storage Battery Electrode.-Louis H. Flanders, Wilkinsburg, Pa., assignor to the West-

inghouse Machine Co., a corporation of Pesselvania. Filed December 15, 1905. 935,276. Mud Guard for Vehicles.—Harold J.

Shrapnel, Brixton, England. Filed December 4. 1 90**8.** 

935,328. Sliding Gear Mechanism.—Henry M. Russell, Jr., Wheeling, W. Va. Filed May 14. 1000.

935,351. Gear Case.-George W. Bandy, Talla-

hassee, Fla. Filed April 16, 1909. 935,387. Gasket.—Charles I. E. Mastin, Paterson, N. J. Filed June 1, 1909.

935.437. Lamp Operating Mechanism.—Artemus R. Warfield and Joshua B. Nicholson, Wash-

ington, D. C. Filed December 23, 1908. 935,525. Shock Absorber.—William B. Knapp.

Stoneham, Mass., assignor to Knapp-Greenw Co., Boston, Mass., a corporation of Maine. Filed September 19, 1908.

935,582. Motor Vehicle.—Robert H. Bownen anon City, Col. Original application filed Octo Canon City, Col. ber 30, 1907. Divided and this application filed May 29, 1908.

935,583. Speedometer.—James H. Bullard and Edwin W. Bullard, Springfield, Mass., assignors to Bullard Specialty Co., Springfield, Mass., a corporation of Massachusetts. Filed December 21. 1906.

935,610. Steering Mechanism .-- August Maulach, near Tabor, S. Dak.; A. J. Wilcox, executor of said Mauksch, deceased. Filed November 2, 1907. 935,622. Shock Absorbing Wheel.—George F. Crass, Ithaca, N. Y., assignor of one-half to David Finkelstein, Ithaca, N. Y. Filed August 20,

13,024. Process for Preventing and Laying of Dust Through the Application to Roads or Real Material of an Aqueous Emulsion of Oil-William M. Sandison, Ashfield, Ayton, Scotland, ssignor of one-half to Herbert G. McKerrow, Newton, Mass. Filed February 18, 1908.

#### Patents Issued October 5, 1909.

935,644. Clutch.-Howard E. Coffin, Detrok, Mich., assignor to Chalmers-Detroit Motor Ca. Detroit, Mich., a corporation of Michigan. Flied November 6, 1908.

Carburetor.-William K. 935.833. Perth Amboy, N. J., assignor to J. P. Hall, East Orange, N. J. Filed November 24, 1908. 935,837. Valve for Pneumatic Tiren.—Fred T.

Clayton, Sandwich, Mass. Filed August 1, 190 935.882. Transmission Mechanism.-John W.R. Andrews, Leominster, Mass. Filed May 3, 1909.
935,909. Friction Clutch.—William A. E. Hen

rici, Boston, Mass. Filed January 25, 1901.
935,927. Automobile Brake Attachment. Reifsnyder, Canton, Ohio. Filed Neventor 11, 1907.

11, 1907.
935.931. High Tension Spark Plug.—John Sharp and William Sharp, Cleveland, Ohio. Find De cember 9, 1908.

935,948. Lubricator.-William O. Turner, Be mont, Tex. Filed June 16, 1908. Serial No. 436-709. Renewed September 1, 1909. 936,064. Carburetor.—Walter C. Westaway,

Rockford, Ill., assignor, by direct and mesne assignments, to J. W. Duntley, Chicago, Ill. Filed

September 28, 1005. 936,074. Electrically Operated Valve.-Warren W. Annable, Grand Rapids, Mich., assignor to the Starter Manufacturing Co., Grand Rapids, Mich, a corporation of Michigan. Filed April 26, 1909. 936,075. Automobile Protector. - David F. Ars-

strong, Groton, Conn. Filed October 22, 1908. 936,102. Clutch Mechanism.-Victor J. Emery,

Quincy, Mass. Filed April 13, 1906. 936,118. Carburetor.—George T. Glover, Chicago, Ill. Filed July 10, 1906.

936,190. Friction Clutch.-Charles Tuckfeld, East Molesey, England. Filed August 27, 1908.

# The Horseless Age

First Automobile Journal in the English Language

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**NUMBER 25** 

### The Choice of a Lubricant.

By David L. Gallup.

In the selection of lubricating oil the average man must be guided for the most part by the advice of others, and as that usually comes from an agent or salesman, he is more often confused than enlightened. Many times he is overwhelmed by the arguments put forth by the salesman, who dilates upon the color of a particular oil and seeks to show what effect it has upon its lubricating properties; its low cold test; high flash and fire tests; how it is

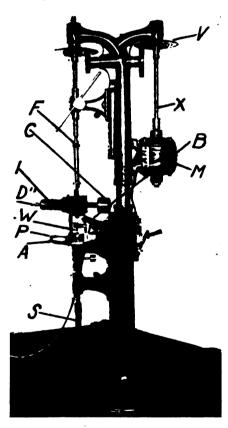


Fig. 1.—Kingsbury Oil Testing Machine. A, arc; B, Bunsen burner; C, counterbalance; F, flexible shaft; I, index; M, motor; P, pointer; S, auxiliary spring; V, variable speed.

manufactured from the purest stock obtainable; mentions its specific gravity; and draws attention to its viscosity."

To be plain for a minute, what does the average man know about "viscosity," and what cares he so long as the oil lubricates his engines properly and requires the minimum of attention? To be sure, these features are very often indicative of the characteristics of an oil, and are of immeasurable value when used in the right place

and by the right men, who know exactly what they mean; but the point to be emphasized is that the possession of any one or two of these is not positive proof that the lubricant will lubricate. Many an oil has a high flash and fire test, but fails when in a cylinder. Others have light color, and still others have dark color, and apparently both are successful. How, then, can the best oil be determined? Unfortunately, the general public have neither the time nor the facilities for the determination of the qualities of an oil, so this must be left to those possessing the necessary apparatus and the ability to obtain impartial results.

With these ideas in mind, and also the fact that apparently little information is available, the Department of Mechanical Engineering of the Worcester Polytechnic Institute has fitted out a laboratory for the complete testing of the properties of various oils, and in particular the lubricating qualities of the same when subjected to

conditions duplicating those in practice. The piece of apparatus used for this latter purpose is of considerable value. and will be described at some length, as it is novel in construction and not in common use. The other pieces of apparatus, such as for determining the "cold test," "flash" and "fire" test, "viscosity," etc., being simple in construction, and also well known, no description will be attempted. The particular machine referred to is known as the "Kingsbury oil testing machine," and was designed by Prof. Albert Kingsbury, for some years professor of applied mechanics at the Worcester Polytechnic Institute. The accompanying illustrations (Figs. 1 and 2) will aid in the description.

THE KINGSBURY OIL TESTING MACHINE.

A is a steel journal fitting between two brasses B, which are contained in the receptacle R. and in which the oil to be tested is placed. The two brasses are forced together by means of the screw S, which is en-

closed in the portion indicated. C is the nut by which the compression of the screw may be adjusted, and D is the handle which controls the throwing on or off of the load without in any way disturbing the adjustment of the screw S. E is a counterbalance. The frame indicated by F is supported vertically by a small wire W from the point O, and being balanced by E, so that the wire is always vertical, hangs in such a manner that there is no contact which might offer frictional resistance to the turning of the frame F. When rotation of the journal A takes place, a twist (the amount depending upon the speed of rotation, pressure between the brasses and journal, and the frictional qualities of the oil) occurs in the wire and the pointer P gives accurate indication of the friction due to the oil under the conditions then existing. The wire is the only thing which prevents the rotation of the frame F. For oils which have a high coefficient of friction, and are beyond the capacity of the

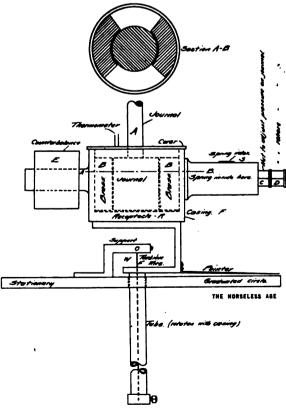


FIG. 2.—KINGSBURY OIL TESTING MACHINE.

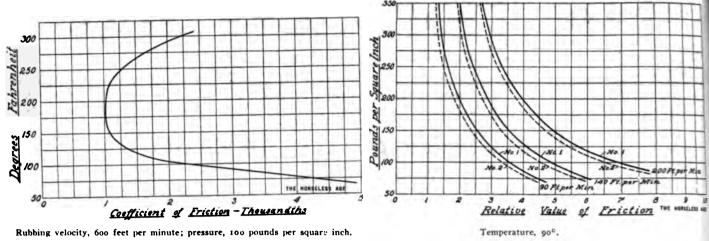


Fig. 3.

i. 3.

general way the flash point. This is to be expected, for when the flash point of the oil is reached the constituent parts are broken up and the lubricating qualities of

the oil are destroyed.

coil spring H may be brought into action.

The journal is driven by a motor attached to the shaft, as indicated, and interposed between the journal and motor shaft is the variable speed device designed and patented by the Washburn Shops of the W. P. I. By means of this, and also a planetary gear device not shown, but inserted at X in place of the regular shaft, a

natural spring of the wire W, an auxiliary

variation in speed may be obtained ranging from a given number of revolutions per minute to sixteen times as great.

CONDITIONS OF TEST.

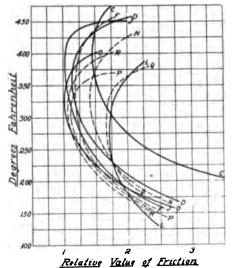
From the above description it is evident that an oil may be tested under any condition of temperature, pressure or speed of rotation, varying any one condition or all at will, and since all the conditions which occur in the automobile engine may be included under these three, the value of the apparatus is self evident.

In these tests great stress was laid upon the results as shown by this piece of apparatus, for although the flash, fire, cold, viscosity, etc., tests may be of considerable interest, the real value of an oil centres around the question of what it will actually do in a motor. Various oils, including the best, some good, a few indifferent, and a whole lot bad, were tested under certain conditions of speed, pressure and temperature, and the results for a number of them plotted in the form of curves. Fig. 3 is a typical example of results of tests made on an oil showing the change in the value of the coefficient of friction under varying temperatures, something which is very well explained in a paper by Professor Kingsbury before the A. S. M. E. (Trans. A. S. M. E., Vol. 24), and to which the reader is referred. It is readily seen how the changing of the temperature affects the frictional qualities of the oil, this being brought about by a change in the relative viscosity. Again, when the temperature has reached, in this case, 225 degrees, the coefficient of friction begins to increase, showing that above that the oil quickly loses its value as a lubricant. This upper point will vary somewhat under different conditions of pressure and speed, but approaches in a

Right here attention is called to the subsequent curves representing the results of tests, and in which the term "relative value of friction" is used. This is done in order to do away with calculations which would be necessary in case the coefficient of friction was desired, and also to obviate the possibility of any dispute or argument which might arise as to the actual value of this coefficient, the latter being affected by local conditions in the bearing itself, but the effects of which are eliminated by the use of the term mentioned, since it refers merely to a comparison of oils under exactly the same conditions. These curves also show very clearly how various conditions may be met.

VALUE OF APPARATUS AS BASIS FOR COMPARISON.

One of the chief characteristics of this particular piece of apparatus is what might be termed its "consistency" of performance. It is not meant by this that if the machine



Rubbing velocity, 300 feet per minute; pressure, 175 pounds per square inch.

Fig. 5.

be adjusted for a certain set of conditions, and certain values of coefficient are determined, that at the end of a year's time it will give exactly the same values for (apparently) the same set of conditions, for, as indicated above, the surface of the bearing will change in the course of time. However, when tests are made, one after another the results are absolutely accurate To prevent any possibility of doubt, one particular oil may be used as a standard, and tested often enough to check up any change which may be taking place in the bearing. It is safe to assume that a given specimen of oil will always bear the same relation to its neighbors.

Fig. 4.

To illustrate the sensitiveness of the machine an incident may be cited: A local engineer some time ago submitted two samples of oil to be tested for comparison, one known to be standard, but more expensive than the second. It was his purpose to discover if under the conditions of operation with which he was dealing the second oil would serve the purpose as well as the more expensive lubricant. Tests were made and curves of the results plotted, but it was discovered that there was no difference. There immediately arose a doubt as to the accuracy of the results, and so another sample was called for and tested, and exactly similar results were obtained. The engineer was acquainted with the facts of the case, and, of course, became convinced of the uselessness of the apparatus. It was with considerable relief to all concerned that information was received later that through carelessness on the part of his assistant two samples of the same oil had been submitted for test.

#### RESULTS.

In the tests which have been made various kinds of oils have been included, from the best to the poorest, but curves for only the better grades are shown. The oils are referred to by letter as A. B, C, etc. It is also to be noted that the conditions of speed, pressure, etc., are taken arbitrarily, but are perfectly good for purposes of comparison and illustration, especially so since the "characteristic" of all ordinary oils is practically the

same-hence deductions may be correctly drawn regarding their behavior under other conditions than those under consideration. Tables are given of the cost of the oils, flash, fire and viscosity tests. A few conclusions regarding the action of the oils may not be out of place, even though much is self evident from the curves. It will be noted (Fig. 5) that the actual difference in coefficient of friction of the various oils does not vary greatly at what might be termed low working temperatures in an automobile engine, say 300° Fahr. This is practically true in the case of all the oils except C, L, N and Q. However, this is not the important point. The real fact to be noted is the difference in the "minimum coefficient ranges" of the various oils. Starting at about 260° Fahr., they are very much alike, but along at 340° Fahr, some begin to show evidences of 'breaking up"; others at 380°, and the best (J) not till 430°. If the temperature range in the combustion chamber was always from 280 to 350° Fahr. there would be little object (other things being equal) in paying twice as much for one lubricant as for another, but when it is considered that especially in this type of engine the temperature varies between extreme limits the value of an oil like J is plainly seen. Some are fairly successful with a cheaper grade of oil, because either a large amount is used or the average running does not cause the egine to labor (in other words, it runs much of the time on low throttle), or the engine is more than amply cooled. (Reference will be made later on to the effect of too much oil.) The actual value of the coefficient of friction, as shown in oil J, is a trifle over 0.001, and even though the values of the coefficient for all of the oils shown in Fig. 5 are almost negligible, the fact that the friction for Q, for illustration, is nearly 75 per cent. greater than that for J points to a very great advantage of the latter over the former. Needless to say J is a more expensive

oil. Between P and J (Fig. 5) there is no appreciable difference in friction values, and as previously intimated there exists no reason for using the more expensive J in place of P when the temperature does not exceed 340°, but, as is well known, this is a "low" temperature in most automobile cylinders, and this, of course, gives the preference to J.

Another curve is shown (Fig. 6) giving results from three oils—I a standard make, 2 a well known oil, and 5 a mixture of the two (the mixture calculated to bring down the price of the better grade and to raise the lubricating qualities of the poorer). In the flash and fire tests no change is evident from the mixing, and this is easily understood, since the flash point is the temperature at which the more easily broken up portions of the oil begin to separate from the main body and take fire, and, of course, the mixture containing same constituents as the two component oils, it will break up at

						Visco	
						•	2120
Oil	.Price.	Sp. Gr.	Flash.	Fire.	Cold.	Fabr.	Fahr.
A.	\$0.75	.872	415	478	36	208	90
B.	.75	.881	446	505	36	250	94
C.	.55	. 894	490	544	55	1950	134
D.	-55	.887	395	452	45	367	94
E.							
F.	-75	.872	434	492	37	213	86
G.				• • •	• •		
H.					• •		• •
I.	• • •	• • • •			••		
J.	.75	.886	442	508	34	228	94
ĸ.	• • •	• • • •	515	607	57		
L.	• • •	.875	388	440	36	162	86
M.					45		
N.	.75	. 878	430	486	35	248	90

TABLE No. I.

the same point as the oil having the lowest flash point. The lubricating qualities are bettered only slightly by the mixture.

469 39

470 37

479

408

428

422

.65

.65

65

.878

.887

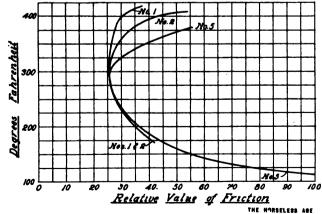
88

182

238

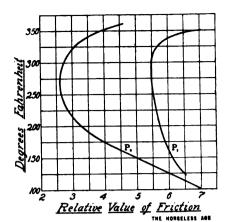
248

Another point which is of considerable importance is illustrated in the comparison of which the results are shown in Fig. 7. The oil indicated as P possesses flash and fire points higher than P, yet under test the



Rubbing velocity, 370 feet per minute; pressure, 137 pounds per square inch. Fig. 6.

	Flash Point.	Fire Test.
		505° Fahr. 440° Fahr.
	 380° Fahr.	440° Fahr.
No. 5	 380° Fahr.	440° Fahr.



Rubbing velocity, 200 feet per minute; pressure, 400 pounds per square inch. FIG. 7.

lubricating qualities are inferior. This merely goes to show that while ordinarily high flash and fire points may indicate a good lubricant to the average buyer and be of considerable value as a talking point to the salesman, it is not proof as to what the oil will actually do in service. Incidentally, it might be mentioned that during the process of heating oil P, long before the flash point was reached, the oil turned black and considerable precipitate was obtained.

There are many points regarding the superiority of one oil over another which are demonstrated every day, and which do not require a delicate apparatus like the one described. For example, it is well known that of two oils known to be of standard qualities, one may be totally unfited for the service for which the other is used with great success. An engine fitted with tight pistons may run well on a thin oil, whereas the other oil, having more body, at the same temperature will cause hard running and ultimately scoring. It is also known that if a change is made from even a poor oil to a better oftentimes trouble will arise due to some peculiarities not fully understood.

To state definitely what each buyer should do in his particular engine is impossible for obvious reasons. However, to those who do not care to make, or have made, any special investigation as to the qualities of various oils, the following may be of value:

Study the lubrication in your particular car; use enough oil, but not too much. If the engine heats, don't conclude without investigating that it is from lack of oil. Too much oil will result in the formation of vapor, and this has the same effect as a slow burning mixture, i. e., it causes heating. The burning of this vapor will deposit carbon in most engines. Deposition of carbon in an engine, on the other hand, is not always traceable to the kind of lubricant, as it may be due to the peculiar shape of the combustion chamber, scavenging, quality of mixture,

Obtain a good oil and give it a fair show, and don't change every time an agent shows up with a less costly oil, "ever so much more effective than the one you are using." The higher the temperature at which an engine works the better the oil demanded. High temperatures mean efficiency, and a slight increase in the cost of the oil will never amount to as much as the saving in gasoline

#### CONCLUSIONS.

- 1. Don't tolerate cheap oils nor oils not specially adapted to automobile engines. An oil at 75 cents may cost less in a year than one at 40 cents, due to saving in wear on the engine and also because ordinarily less oil may be used with better success.
- 2. Don't value an oil by its color to the exclusion of all else. While light color usually denotes the results of filtering to rid the oil of impurities, some have resorted to acids to obtain the same effect in color, and this process is, of course. detrimental to the oil as a lubricant. There are, however, oils of good reputation which are quite dark. As a general thing, though, most dark oils are more or less viscous, and this property, while of considerable value with loose fitting pistons (as pointed out above) and bearings, is of no value in the average automobile engine of today, which is very nicely fitted, especially the pistons and bearings. For this reason such oils are not as satisfactory as the lighter oils. The all important feature is to preserve the film between the surfaces.
- 3. Don't accept high flash and fire tests as conclusive evidence of superiority. Most all good oils have high flash and fire points, but oils having high flash and fire tests are not all good.
- 4. Don't necessarily accept the agent's advice as to the oil to be used. This does not refer to dealers or manufacturers of high grade automobiles, all of whom have the long life of the engine in mind when recommending a lubricant. There are, as is well known, a number of dealers and manufacturers who are tied up in some way with the oil industry, and have an axe to grind in advising a certain oil.
- 5. All of the above may be condensed for many in the simple statement: "Buy the best oil and of a concern of good reputation."

# Penetration of Air and Carbonic Acid Through Tire Walls.

The Diamond Rubber Company, of Akron, Ohio, are reported to have made comparative tests to show the rate of escape of air and carbonic acid gas, respectively, from pneumatic tires. On October 14 at 1:30 p. m. three tires were pumped up with air to 100 pounds pressure, and three similar tires were inflated with carbonic acid gas to the same pressure. On October 21 at 1:30 p. m. the air filled tires are said to have registered 92 pounds each, and the three gas filled tires, 41, 50 and 51 pounds, respectively.

#### New Italian Automobile Regulations.

A new automobile law, signed at Rome on July 29 last, has recently gone into effect in Italy. It is very comprehensive, comprising no less than sixty-nine sections. The Minister of Public Works (Special Railway Bureau) will have charge of the enforcement of the law. The latter covers motorcycles (described as vehicles with two or three wheels), automobiles (vehicles with four wheels), propelled by any form of motive power, and trackless trolley cars. Local authorities may adopt special regulations for their territory, which must, however, not conflict with the general law and be approved by the Minister of Public Works.

Section 4 of the law relates to permissible speeds. It provides that mechanically propelled vehicles must always be so driven as not to obstruct free circulation, and not to constitute a danger to other persons or objects on the road; but in no case must the speed be greater than 15 km. (9.4 miles) per hour in the city, 40 km. (25 miles) per hour in the country during the day, and 20 km. (121/2 miles) per hour at night. Besides, the speed must be moderated at the approach to hidden turns, road intersections, railway grade crossings and points of congested traffic. The speed must also be reduced in accordance with municipal regulations, as indicated by signs along the roads passing through these municipalities, and at crosswalks where people are crossing the roads.

Every vehicle must carry two lights in front, throwing a beam of white light ahead which illuminates the road for a distance of 100 yards; and in the rear a lamp throwing a white light sideways, and a red light to the rear. Lamps must be lighted from dusk to dawn, and also during the day in case of fog. The use of glaring headlights in the city is forbidden.

All mechanically propelled vehicles must constantly keep to the right side of the road and pass to the left side only on overtaking other vehicles. However, municipal councils of cities with over 25,000 inhabitants may decree that within these cities all vehicles shall keep to the left, in which case this must be properly announced by signs at the entrances to the city.

All motor vehicles must be equipped with a one tone horn. The tone must be of low note for automobiles, and of high note for motorcycles. All other signalling devices are forbidden, except that within the open country sirens may be used in a "subsidiary" way.

All vehicles must carry metallic registration number tags both in front and rear. For privately owned cars the tags must be of rectangular form, with a white background, with the number corresponding to the province in which the car is registered thereon in red, and the registration number in black. Each numeral must occupy a space 4 inches high by 2.4 inches wide, and have a thickness of stroke of three-eighths of an inch. The figures must be in relief.

In case the front number plate should interfere with the normal functions of the radiator the number may be painted on the front of the vehicle with enamel paint. The number tags must be kept clean, so that the numbers can always be easily read.

Muffler cut-outs can be used only in the open country. Each car must have two independent brakes. If other than rubber tires are used they must not be less than 4 inches wide. The total weight per axle must not exceed 25 quintals (of 110 pounds) unless special permission is obtained from the Minister of Public Works. For the operation of road trains a special permit must be obtained from the Minister of Public Works.

Every vehicle for private use must be registered with the authorities of the province in which the owner resides. Applicant must present a copy of the official acceptance of the type of vehicle and a statement of the manufacturer that this vehicle corresponds with the type accepted. This part of the regulations is similar to the corresponding part of the French law. Manufacturers wishing to have a type of car "accepted" must apply to the Minister of Public Works, inclosing a fee of \$20. The chassis is submitted to a test by officials of the Railway Bureau, for which a fee of \$4 must be paid.

Motor vehicles can be driven only by persons who perfectly understand the construction and operation of the machine. To that end every driver must provide himself with a certificate of capacity which is issued by the prefect of the province in which he resides. When applying for this certificate he must submit to the prefect a certificate of birth, showing that he has completed his twenty-first year. If he is not yet twenty-one years of age, but has passed his eighteenth year, he must obtain the consent of the legal representative; also a penal certificate of recent date, a medical certificate of recent date, with special reference to his faculties of sight and hearing, and a certificate of graduation from a driver's school recognized by the Minister of Public Works and the Minister of Agriculture. Industry and Commerce. In case the latter certificate cannot be furnished applicant must pass an examination before an official of the Railway Inspection Bureau, for which a fee of \$2 is charged.

When a driver is convicted of an infraction of the law his certificate of proficiency is returned to the prefect who issued it, and the conviction is entered upon it. In case of an accident in which persons are injured the police officers charged with investigating the case will immediately obtain the certificate of the driver and send it on to the Minister of Public Works, who will decide whether is shall be revoked.

The Automobile Dealers' Association of the Netherlands has decided not to hold an automobile show during the coming year.

### The Purchase of Second Hand Cars.

By Albert L. Clough.

Almost everyone connected with the industry who is supposed to possess special technical knowledge of the same is occasionally approached by prospective purchasers for advice as to the wisest course to pursue. One of the questions most commonly asked is whether it is better to buy a new or a second hand car. The class of people asking this question most frequently are those who have a certain sum of money to expend which may not be exceeded, and who are deeply concerned that their money shall be invested to the best advantage. The pros and cons are so numerous that it is difficult to give an answer with assurance.

The argument in favor of buying a second hand car is based upon the assumption that the discount in the price of such a car, on account of its being second hand, is greater than its actual decrease in service value occasioned by the use it has been put to. This view implies that cars are frequently sacrificed by their owners; that a certain car may have proved unfitted to the purposes or unsatisfactory to the special taste of its original owner, though it may be a good car and perfectly adapted to some other person's requirements; that cars are sometimes sold at sacrifice prices to meet their owners' financial emergencies and under similar circumstances.

It is a common belief that when purchasing a car in an unused condition one is paying the agent's commission, and a large sum to cover advertising and other vending charges; but that in buying a car second hand these charges are not present in the same degree and that one is paving for what the consensus of the market regards as the prospective service value of the vehicle, In short, that when he sells the first owner "drops" the portion of the first cost which represented the more intangible part of the car's price, and something, perhaps, for the use he has had of it, and obtains a sum which is approximately a measure of the car's expected actual value in service.

There is considerable justification for this view. Not so very much expense is usually put into the selling of second hand cars. The ordinary dealer's business is to sell new cars, and the disposal of second hand cars is a side line with most such, He has made a profit on the first sale of each car, and he may be contented with a smaller margin of profit on the second sale or may even be satisfied to "break even,"

DEALER'S ALLOWANCES.

Second hand prices are curiously inconsistent, and, to all appearances, the same thing is offered at widely varying figures. As a rule the owner who trades in his car to a dealer for a new car of a competing line makes a much larger sacrifice than the owner who exchanges his old car for a new one of the same make. Dealers are anxious to keep the customers whom they have once secured, and to prevent users of the car they represent from adopting another make. They thus often make very flattering allowances for old cars of the make which they represent, and call attention to the fact that cars of this make command good prices second hand. When an owner turns in his car to the agent of a competing manufacturer the latter is anxious to make an attractive allowance, in order that he may secure a new customer; but, on the other hand, he dislikes to accord too high a second hand price to the car of competing make. On the average, it seems to be the fact that the allowance made for a used car by the agent of that make is larger than that made by the dealer in another make, and this leads to higher cash prices being charged for second hand cars of their own make than for those of other makes of similar grade. The second hand car purchased from the representative of that particular make may, however, be purchased with the expectation that it is considerably more nearly as represented and has been better overhauled than the car which is bought from the dealer in a competing line of cars. In the former case the dealer is endeavoring to enhance the reputation of his make by doing everything in his power to insure that the second hand car gives good satisfaction; while of the latter case it may at least be said that he has much less at stake, and naturally no special interest in the future of his competitor's product.

LAW OF SUPPLY AND DEMAND.

The price of second hand cars might naturally be expected to be determined very largely by the law of supply and demand, but the workings of this law in this particular sphere are rather obscure. In fact, second hand prices seem to be little standardized, and one purchasing a car has little definite guidance as to the price he ought

It is natural to assume that so long as progress in automobile technique is rapid and changes and improvements are at all marked, the prices of earlier models in the second hand market will be less than during periods when the art is more nearly at a standstill. It is certain that so long as improvements are being frequently and numerously adopted the value of cars of earlier model is decidedly less than under conditions of stable practice in the industry. Were the automobile art in a fully formed condition and practice substantially standardized, the price of a second hand car should be very closely related to its actual future service value. Under the contrary conditions which exist today second hand prices ought to be lower than they would be under the circumstances just assumed, because of the somewhat rapid obsolescence of cars as now produced.

EFFECT OF PRICE FLUCTUATIONS.

Whenever a decided reduction in the prices of new cars takes place, such as has recently been witnessed, one should expect an at least corresponding reduction in all second hand prices, unless some other factor, such as an increased general demand for cars which the industry cannot fully meet, acts to neutralize this tendency. It is quite possible that second hand prices, at the present time, may not have dropped far enough to represent the actual decrease of values that has been occasioned by the recent reduction in factory prices, especially as the demand for cars of all classes is so brisk just now.

The writer believes that so long as improved methods of construction and of production are being adopted, and so long as factory prices are on the down grade (despite exceptions), the conditions are not especially favorable for buying second hand cars, for it is so very questionable whether second hand prices represent quite enough discount from the original prices to equal the reduction in actual values.

EARLIER MODELS.

In buying a second hand car of earlier model the main questions that arise are as to what extent its serviceability has been reduced by the work which it has performed, and the degree in which it is obsolete in essential respects.

It is by no means always that the mileage which such a car has covered can be determined with any degree of accuracy, although this is a most vital piece of information. The current belief is that the important working parts are capable only of a certain, though indeterminate, number of repetitions of their functions, and that every mile run thus reduces their future expectancy of service.

Examination of a second hand car by an expert is worth something as to determining condition, but it is mainly useful in ascertaining the adjustment of moving parts and the security of holding devices. It gives little information as to how near to failure certain important working and structural parts may be. A car which has been recently overhauled and adjusted may pass this kind of an inspection, but, nevertheless, the crank shaft may be within a few hundred thousand revolutions of failure.

"MORAL" HAZARDS.

It is sufficiently difficult to estimate the loss in value due to use, but it is much harder to determine the depreciative effects of abuse. The best indication as to how a car has been handled may be obtained froma knowledge of the skill and character of its former owner or owners. The "moral hazard" involved in buying a second hand

car, used by persons unknown to the purchaser, is considerable. For instance, one cannot know whether the car has been run into a ditch, and the frame strained, and perhaps crudely straightened, so that it is merely "hanging by the gills," ready to fail completely when subjected to another severe stress. The reverse gears may have been accidentally thrown in while the car was moving forward, and the gear box so racked that it will part a little later under some severe though legitimate service condition. Parts which have been strained nearly to the limit, and thousands of miles of legitimate service "taken out of them," generally cannot be detected by a machinist's examination unless such parts are actually bent or cracked, and even such visible defects are readily overlooked. In this connection it should be remembered that repair parts for other than current models are not readily obtainable from all automobile manufacturers, and are likely to require some fitting, for it is only lately that cars have been built in numbers permitting the adoption of anything approaching interchangeability.

#### FOR A NEW DRIVER.

It is often contended that a second hand car is more economical for a new driver to commence his driving career upon than a new one, as damage due to unintelligent handling is likely to be less costly. This may be true if the car in question is "picked up" at a very low figure, but it is a fact that older models are more unhandy to lubricate and to keep in adjustment, the controlling devices are at least no more simple and convenient, and that usually no instruction book and little personal instruction accompany the purchase of a second hand vehicle.

While the manufacturer's warranty which accompanies a new car is of limited value as a binding legal obligation for the benefit of the purchaser, it is a fact, very much to the credit of the industry, that most manufacturers are rather liberal to the purchasers of their cars in the matter of replacements. It can hardly be expected that, after a car changes hands and a long time has elapsed since purchase, the manufacturer will maintain the liberal policy extended to his original customer for a reasonable but restricted period.

It is only within the last two years, and mainly within the last year, that the practice of producing cars upon an exceedingly large scale has become an important factor in the industry. Enormous savings per car produced in labor cost and overhead charges have been effected which enable good cars to be sold at very much reduced prices. At the same time it has become possible to employ in the manufacture of low priced cars, through the extension of late metallurgical knowledge, materials which closely approach in fitness those used only upon high priced cars a few years ago. The large concerns producing moderate priced cars can afford to maintain metallurgical testing departments, and to employ methods of

heat treatment which were until recently made use of only by certain advanced manufacturers

The result has been to bring the quality of the low priced car of the present day closer to that of the high priced cars of a few years ago, and to reduce the advantage to be gained by purchasing a second hand high priced car.

#### COMPARISON ADVISABLE.

If one is thinking of spending a certain sum of money for a car, it will be well to make a thorough investigation as to what can be bought new for that sum, to gather as much information as possible as to the design, material and workmanship of these cars, and as to the improvements and retinements which they offer that are not found in the cars of a year or two previous. If then, the purchase of a second hand car still seems the wisest course, the following suggestions may be worthy of consideration: Before deciding to pay a certain sum for a second hand car find out what cars of the same model and similar condition can be bought for elsewhere, especially in the large automobile centres. Ascertain, if possible, who were the former owners of the car in question, what sort of people they are and how much service the car has seen. Arrange for a good, practical demonstration and for a thorough examination of the car by a good automobile mechanic. Observe to what extent the particular car in question can be changed so as to bring it more nearly up to date, and what the cost will be to do this and to add the equipment which it lacks. Buy only from a reputable party or concern, securing a guarantee, if possible, from the seller, if he is responsible, and consider the advisability of buying a "factory overhauled" car, for sometimes better second hand vehicles may be obtained from the manufacturers than elsewhere.

#### A Pneumatic Jack.

The equipment of the Delaunay-Belleville car delivered to the Czar of Russia includes a pneumatic jack which is operated with air from a storage tank carried on the car. The jack consists of a vertical cylinder with a leather washer piston connected to a tubular piston rod which forms the ram of the jack, and carries a ball and socket jointed pad at its upper end. Air is admitted to the lower end of the cylinder by opening a needle valve, after the hose from the air tank has first been secured to the hose coupling. The ram of the jack then rises, and when it has attained the desired position the air valve is closed and a pin is inserted through holes in the tubular ram where the latter emerges from the head of the cylinder. When it is desired to lower the ram again, the pin is first withdrawn and an escape valve is opened. The pneumatic jack would appear to possess advantages in the way of saving muscular effort, but it is doubtful whether it is quicker and more compact than the best forms of mechanical jacks now on the market.

Hydrogen for Tire Inflation.

We read in the Allgemeine Automobil-Zeitung that M. Drouilly, a French mventor, has invented a process for inflating automobile tires with hydrogen generated by the decomposition of water under the influence of specially prepared aluminum. It is known that aluminum will decompose water in the presence of alkalies, producing clayey earths and hydrogen. Hydrogen thus produced has already been used by Drouilly, at the moment of its generation, while in the nascent state, for decoloring the saccharine juice of sugar beets, and it has also been used for the inflation of balloons, notably by the Russian army during the Russo-Japanese War.

For the inflation of tires aluminum m granular form is used, which, while giving rise to a less energetic reaction than aluminum powder, is nevertheless sufficiently active, and it keeps down the temperature increase and makes the manipulation easier.

Drouilly makes use of the well known air bottles commonly used for the inflation of pneumatic tires. After unscrewing the bronze cap he introduces into such a bottle of 3 litres capacity 300 grams of gramlated aluminum and 300 grams of water. Upon replacing the cap 375 litres of hydrogen are generated, which are compressed to a pressure of 150 atmospheres (2,500 pounds per square inch) in the remaining space of 21/2 litres. The precipitate, consisting of alkaline earths, may be easily washed out. In order to do away with the addition of potassium hydrate, or a similar alkaline compound, Drouilly adds a few grams of pulverized bichloride of mercury to the aluminum, which is sufficient to start the reac-

The pressure within the air bottle may rise as high at 1,000 atmospheres, depending upon the amount of the reacting substances used, so that great care is necessary in handling the apparatus. In a recent experiment, in which the necessary safety measures were taken, a tube which had been tested to 600 atmospheres was exploded by this process, and some of the splinters of the bottle were found at 50 yards from the point of explosion. M. Drouilly is now occupied with the construction of a safety valve which shall prevent such mishaps. It is most important to add a sufficient amount of water, in order that the resulting rise in temperature does not vaporize the water. as in that case the steam pressure would be added to the gas pressure and an explosion would result.

This novel process permits of utilizing the empty steel air bottles which otherwise would represent only dead weight. It is also claimed that inflation with hydrogen perature of liquefaction, and diffuses, therethat hydrogen will not pass through the walls of the tire as readily as air. It is claimed that the diffusion of a gas through rubber walls depends upon the point of liquefaction. Hydrogen has a very low temperature of liquefaction, and diffuses, therefore, very slowly through a rubber wall.

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#### Mathematics Rehabilitated.

We publish in this issue two pages of letters from readers in response to our recent editorial on mathematical articles. These are by no means all of the letters received in reply to our appeal, but we considered that these would be sufficient to show that mathematical articles do serve a useful purpose and are of interest to a considerable section of our readers. Needless to say, we will not discontinue the publication of these articles.

It will be observed on reading the letters that many of the writers use the terms mathematical and technical articles interchangeably, being evidently of the opinion that there can be no real technical article on automobile subjects without the use of mathematics. The fact of the matter is that the use of mathematics is necessary in the design of automobiles, and the man who attempts to enter this field without mathematical education will soon find that he is laboring under a very great handicap. The

number of men with mathematical training in the automobile business is by no means small, and their intercommunication through the medium of a technical paper conduces to more rapid progress in automobile construction. The owner, of course, does not care to go into automobile matters to the extent of calculating the stresses in various parts, nevertheless this technical discussion is also of advantage to him, for, as one of the writers aptly remarks, "he receives the benefits with his car." We do not want it inferred, however, that we will confine ourselves entirely to this class of matter. The user, the dealer and the repair man will be equally taken care of.

#### Winter Contest Fiascos.

The annual Quaker City midwinter endurance contest, which had almost attained to the standing of a classic event, has been called off, and now comes the announcement that the Worcester A. C,'s winter endurance run, which had been set for December 17 and 18, had also to be abandoned on account of lack of entries. The cancellation of both of these winter competitionsthe only events of the kind scheduled for this season-calls for an inquiry into the apparent lack of interest in such trials.

In the case of the Quaker City run it is probable that the very inclement weather encountered on last year's run had a deterring effect on possible entrants. The organizing club is a dealers' organization, and the local dealers and nearby manufacturers have always been depended upon for entries. It seems that these became somewhat discouraged by last year's weather conditions, many of the participants having become ill after the run. In such contests it is often necessary for men to take part as observers, reporters, etc., who are not accustomed to outdoor life in winter time, and whose constitution is not equal to the strain imposed by the cold. Besides, the drivers in such a contest, in their eagerness to make a good showing, often forget about their own safety. In case of a breakdown, for instance, they will work themselves into a sweat, and then drive off in the face of a strong wind. In this respect the conditions are entirely different from ordinary winter

While the above consideration may also have been a factor in the failure of the Worcester contest, it is thought, however, that the novel brake test proposed was not looked upon with favor by dealers and private owners. The tests were to be made at

the Worcester Polytechnic Institute in the mechanical laboratory, in which an automobile dynamometer is installed which has been described in these columns. The impression seems to have gained ground that the object was to give the students at the institute opportunity for the experimental study of various cars, and most owners did not feel inclined to lend their cars for this Durpose.

Another reason for the failure of these two proposed contests may have been the superabundance of competitions the past seasons. Manufacturers and others naturally grow tired of competitive events at last. Besides, it is doubtful whether the public can be brought to a full realization of the relative difficulties of a winter tour in stress of weather for the reason that in the accounts of private test runs, even during the best part of the year, the roads are almost invariably described as abominable and beyond description, and they have therefore become more or less hardened to such descriptions, and inclined to make allowances.

#### Lubrication in Cold Weather.

On account of the satisfactory cold tests possessed by the better grades of cylinder oil now in use, no change is usually necessary in the engine lubricant upon the advent of cold weather. With the lubricant employed in the gear box and the driving gear housing the situation is somewhat different. In these two casings a lubricant is usually employed which even under summer temperatures is decidedly viscous, with a sufficient degree of solidity, indeed, so that it acts to quiet the noise of the gears. Such lubricants as a rule thicken rapidly with a reduction in temperature, and in sufficiently cold weather assume a non-fluid or buttery consistency. Their distribution over the gear faces and bearings is then likely to fail, as the moving gears cut out grooves for themselves in the semi-solid mass, and soon operate out of contact with the lubricant, becoming very noisy. Unless the gear shaft bearings are provided with separate oil leads from a mechanical lubricator they may suffer seriously from lack of lubricant, which is normally carried to them by the gear faces. This lack of effective gear box lubrication is especially noticeable in the case of cars which are housed in unheated garages or are left standing for long periods in the open. For a time after starting from a cold condition lubrication is very imperfectly performed, but after having been run for some time the heat carried rearwardly from the engine warms the gear box and thaws the grease, when splash distribution again becomes effective. The driving gear casing shares but little in the effect of the warm air from the engine, and its lubricant is likely to remain in rather a stiff condition, hardly adapted to the effective lubrication of the ball bearings of the differential gear and pinion shaft.

With these facts in view, a recommendation to motorists just now becomes timely as to using a quality of gear case lubricant which is adapted to winter temperatures. By using a grade which possesses a cold test sufficiently high to insure its exhibiting the proper degree of fluidity at all temperatures met with in service, or still better, perhaps, by adding to a rather stiff lubricant a sufficient quantity of rather thin oil, so that at all times there may be lubrication available for the bearings, the difficulty may be successfully met.

### Pneumatic Tires on Commercial Vehicles.

Until very recently it has been a generally accepted belief that the use of pneumatic tires upon commercial vehicles was out of the question from an economic standpoint, and also impracticable on account of their lack of reliability.

However, the equipment with pneumatic tires of a number of European commercial cars and their adoption by certain American manufacturers for trucks of a carrying capacity of about 1½ tons have thrown doubt upon the correctness of the above mentioned view.

There are several causes which have led to this entry of the pneumatic tire into the commercial vehicle field. Pneumatic tires are now capable of decidedly greater service, under given conditions, than they were a few years ago, and they are also more uniform in quality. Great advances have also been made in respect to means for quick tire replacement in event of failure.

Furthermore, it has only recently become recognized that by using pneumatics of very liberal carrying capacity for the load handled not only may a degree of reliability in service much in excess of that ordinarily obtained be secured, but the tire cost per mile may be reduced even when the extra cost of the larger tires is considered. The speed, and consequently the earning capacity, of commercial vehicles has hitherto been strictly limited by the vibration

and noise consequent upon the employment of solid rubber tires. When operated at more than a certain speed a solid tired vehicle is found to depreciate in its general condition at a rapidly increasing rate, and repairs and replacements also become excessive. On the other hand, if a commercial car cannot be successfully operated at a speed somewhat in excess of that of similar horse drawn trucks, the heavy fixed charge, including interest upon the investment, operator's hire, and so forth, seriously reduces its advantage over an animal drawn truck. The belief is growing ground that the use of pneumatic tires will successfully make permissible a higher, and therefore more profitable, rate of speed, and at the same time reduce depreciation and repair expense by softening the shocks to which the mechanism is subjected. With an equipment of dual tires of excess carrying capacity it is contended that the liability of blow-outs can be practically avoided, and that the delays due to punctures will bear but a small ratio to the time saved by the higher allowable speed.

Competition between the solid and the pneumatic tire upon commercial vehicles of moderate capacity, which thus appears to be commencing, may well be closely watched. In this sphere of motor propulsion the decision between the two will rest entirely upon economic grounds.

# Winter Use and Its Importance to the Trade.

It is a common subject of remark that motor cars are recently being more generally kept in service during the winter season in the smaller cities and towns. The custom of jacking up cars, taking off the tires and putting them up for the inclement season appears to be much less popular than formerly in these communities. In the large cities, of course, all the year round service has for some time been the rule rather than the exception.

The widespread realization that the automobile is suitable for winter service under ordinary urban and even village conditions means considerable direct increase of business for the garage proprietor and the supply dealer, and indirectly increased sales for the manufacturer.

The general appreciation of the protective capabilities and the innocuous nature of improved anti-freeze solutions, the adoption of oils of higher cold test, the more general fitting of cars with tops, wind shields and storm curtains; the realization of the meris of traction increasing tire attachments and the placing upon the market of cars with closed bodies at greatly reduced prices have all contributed to the extension of motor car use during cold and inclement weather.

An important influence which has tended to stimulate winter running in the smaller places is the example of the doctors, who were the first class of users to appreciate the utility of the automobile for town service under all weather conditions. The commercial car, the economical employment of which calls for its operation with as few idle days as possible, by being kept in service during the winter, has proved a useful object lesson.

Gradually the taxicab and other public passenger vehicles have made their appearance in the smaller communities, and its regular appearance upon the streets during the winter has exerted a strong exemplary effect.

Then, too, commodious, well heated garages, open at all hours, have been built in nearly all the smaller cities and towns and have encouraged their customers in the winter use of their cars by a system of "in and out" storage furnished at reasonable rates.

In this connection it may be remarked that there are possibilities of further stimulating the winter use of motor cars by an energetic development of means for vehicle heating upon the part of automobile and accessory manufacturers. A large amount of heat is constantly being rejected from automobile motors, which, if only partly utilized, would suffice to warm the cars which they propel and make them exceedingly comfortable in cold weather. Warming by means of heat rejected by the motor is applicable not only to cars with closed bodies, but to ordinary touring cars when equipped with top, side curtains and front protection.

Thus far engine heat has been applied only to the warming of a small number of expensive town cars, but there is no obvious reason why its advantages should not be enjoyed by all who drive cars that are or can be reasonably well closed in. Exhaust heaters adapted for attachment to any make of car can now be purchased, and it is hoped that the practicability of vehicle heating may be more energetically urged upon the public in the future.

The committee of the Chicago A. C. is reported to favor holding the Cobe Race on a track next year.

### Pointers on Front Wheel Brakes.

By Chester S. Ricker and Earle A. Ryder.

It would be well worth the while of some of our American designers to consider the matter of applying front wheel brakes to their product. These brakes have been well received in Europe, and especially in England, and certainly deserve attention.

With the widespread introduction of cars capable of attaining high speeds it becomes necessary, in order to insure the safety of the road using public, to cast

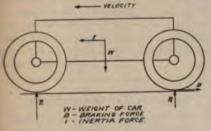


Fig. 1.

about for some means of increasing the braking power of our cars. The higher the speed we reach the greater the importance of any device that makes for greater safety. Many cars now on the market have brakes sufficiently powerful to slide the rear wheels without undue exertion on the part of the driver, so it is obvious that the limit in this direction has been reached. It will be seen, however, that by applying brakes to the front wheels also the braking power of the car will be increased by more than 100 per cent. Many people look at this matter in the same light as the front wheel drive and some other features that have been proposed but not yet perfected.

FEATURE OF THE OLYMPIA SHOW.

The number of exponents of this construction at the Olympia Show indicates how much attention has already been given to the subject. Indeed, the reception tendered this feature by both the public and the trade points to a more extensive use in the future. The sooner we get busy the sooner we shall overtake and pass our foreign rivals, who are still, we must admit, our teachers in many things. (A notable example is the sudden adoption of the flush sided body in this country after at least two years' extensive use in England.)

The same people who look askance at front wheel brakes for automobiles would ridicule a proposition to put out railway cars with brakes on only half the wheels. There is not so much difference between the two cases; in fact, it would seem that the automobile is in greater need of the best possible braking facilities than is the railway car, traveling as it does on a highway which has no block signals, and often at great speed.

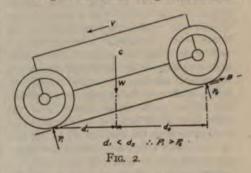
It is to be noted that the usefulness of the front wheels for braking is greater than that of the rear ones, in proportion to the weight on each. When the machine is moving forward, a backwardly acting force applied below the centre of gravity produces a moment tending to tip the car forward, thus bringing more weight, or rather pressure, on the front wheels than they normally bear. This is shown graphically in Fig. 1. The maximum attainable braking force is directly dependent upon the pressure between the wheels and the ground, and this maximum occurs at the point of incipient slippage.

SUPERIORITY ON HILLS.

Every observing driver must have noticed that the brakes on a car seem to lose some of their ability when descending a steep hill; that is, it requires less pressure on the pedal to cause sliding of the wheels than when running on the level. This fact is explained in Fig. 2; a vertical line through the centre of gravity passes nearer the front wheels than the rear ones, so that a greater part of the weight of the car is supported by the former than by the latter. When slowing up while progressing down a hill the effect outlined in Fig.

I is added to this, giving the rear wheels a still greater handicap. Another very great advantage of having one set of brakes on the front wheels is that they may be used alternately with the rear brakes during a long descent, the use of each allowing the other set to cool. Where both brakes operate on the same or adjacent drums this cannot be done.

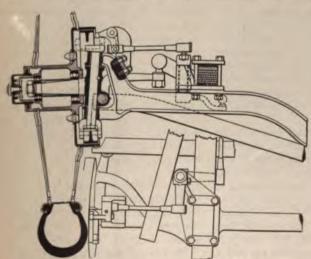
In regard to normal weight distribution



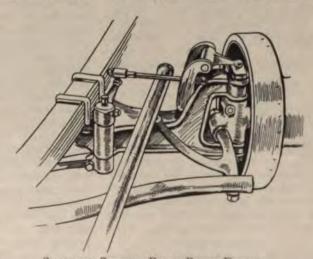
many of the present day runabouts, and practically all cars when stripped for racing, have an excess of weight over the front wheels. Cars with heavy closed bodies are heavy in the rear, but have a high centre of gravity, which intensifies the two actions referred to above.

#### NO EFFECT ON STEERING.

There are no great difficulties lying in the way of the successful application of brakes to the front wheels. However, there are a few precautions to be observed in this connection. Naturally, the first question that rises is whether the steering will be affected in any way. In order that no trouble shall be experienced from forces set up on account of inequality of braking due to difference in the condition of the braking surfaces of opposite sides of the car, a line through the axis of the steering knuckle should meet the plane of the wheel at the point of contact of the wheel with the ground. In the case of the Shef-

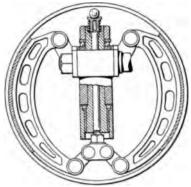


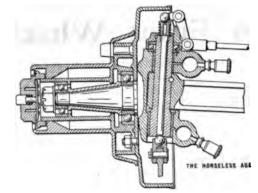
ASSEMBLY SHEFFIELD SIMPLEX FRONT BRAKE



SHEFFIELD SIMPLEX FRONT BRAKE DETAILS.

Note suspension of brake actuating rod from axle instead of from frame.





CROSSLEY FRONT WHEEL BRAKE ASSEMBLY.

field-Simplex this is very nicely accomplished by the use of wire wheels and the expedient of tipping the wheels out and the knuckles in. In case it is not found expedient to bring the axis of the knuckle and the plane of the wheel into the above mentioned relation, the wheel should be set in as close to the knuckle as is possible, for if one brake grips harder than the other the result will be an excess force. tending to steer the machine off to one side of the road. Of course, irreversible steering gears are so generally used that this action could produce no harmful results. except in case it were desired to steer toward the side opposite to the one the machine tended toward. It will be seen from this that an equalizing device will be indispensable. Care should be taken in the selection of the braking surfaces, so as to get those which are least affected by water. dirt, etc. It is possible, and very desirable, to enclose the brakes entirely, as is done in the case of the Arrol-Johnston.

Another point to be observed is that of applying the braking force in such a manner that the turning of the wheels incident to steering will cause no variations in the braking. The arrangement of the operating rods should also be carefully worked out in order that the action of the springs shall not produce variations of pressure on the brakes. In the Crossley car we note that the operating rods are short and are brought from the brakes to points on the side frame members. It looks as though variations in the spring opening would cause variations in the braking force. The logical way of disposing of this matter is to run the short rods from the brakes into points on the axle, and from these points run long rods back to the operating point.

#### ELIMINATION OF SKIDDING.

It has been found in actual use that it is practically impossible to make a car skid by the use of the front wheel brakes. If the car skids due to the action of the rear brakes the skidding may be stopped by releasing them and applying the front ones. It is interesting to note in this connection that most of the manufacturers using both front and rear brakes make the drums for both of the same size, the object apparently being to give equal power to them.

#### EXTRA STRESSES.

It should be remembered that extra stress will be caused in the tie rod unless

the conditions outlined for the knuckle axis and the plane of the wheel are realized, and this most important member must be designed accordingly. The front axle will be subject to bending stress in a fore and aft direction as well as in a vertical plane, and the distance between the spring seats or radius rods and the wheels should be diminished, if possible. The radius rods should be examined for strength, if they are used, and if the springs are called upon to take the stress their fastenings should be checked up.

#### Motor Omnibus Finance.

The London General Omnibus Company, Ltd., held its annual meeting on Wednesday, December 8, and the accounts presented to the shareholders showed a net profit for fifteen months of \$361,025, which is not much when it is known that the total paid up capital is \$12,890,000. For many years prior to the advent of motor omnibuses this company regularly paid dividends varying from 5 to 12 per cent. per annum, and owned about 2,000 horsed buses, together with some 20,000 horses to work them. When motor buses became a commercial proposition the L. G. O. C., Ltd., derided the innovation, and then, when competition set in from their more wideawake competitors who had purchased motor buses, the London General recklessly spent half a million dollars in Continental machines without first seeking the aid of competent technical advisers. Men who had been superintending horses all their lives were put in charge of a big fleet of mechanically propelled machines. A little over twelve months ago, when bankruptcy stared them all in the face, the three principal bus companies in London, viz., the London General, the Vanguard and the London Road Car Company, decided to amalgamate, and raised fresh capital by the issue of debenture stock.

The number of motor buses owned by the combine totals 1,100, all carrying thirty-six passengers and driven by 24 horse power, four cylinder engines, fitted with sliding gear transmission. The company claims to have made a net profit on these vehicles this past year of (in round figures) \$300,000, while they have simultaneously lost \$225,000 upon the working of 1.100 pair horsed vehicles. This shows that the motor buses have earned a fair profit.

The aggregate mileage of the horse and motor buses was 60,320,105, and they carried 408,491,283 passengers in the twelve months. But while 1,053 horsed buses were the average daily number in use out of the 1,100 that are owned, only 634 motor buses, on the average, have been working daily. Although the number of motor buses owned is suppressed in the report, the total is available to anybody caring to make inquiries of the registration authorities.

The most serious item in the report is that not a single cent is written off for depreciation of the rolling stock, and if the proper sum had been allocated in this direction the so called profit would be turned into a loss of \$10,000. The company further face a refusal of the police to renew the licenses of their present types of vehicles unless very costly alterations are undertaken.

#### Street Air Connections.

It has become quite a common thing for tire manufacturers' branches and agencies to have air "on tap," so that customers and in many cases the automobile public in general may reinflate their tires to the proper pressure or inflate a new tire after fitting it to the rim. Sometimes portable air tanks are provided for the purpose, but more often a flexible tubing is used which is connected to some fixture within the store. In many cases a locker is fitted at the side of the building, containing the tubing and universal connections, keys to the lockers being furnished to interested parties. The air is supplied from a tank the pressure in which is maintained by a motor driven pump. The disadvantage of this method is the fact that the tubing has to be unduly long, and passersby are quite likely to trip on it when it is in use.

A scheme which overcomes this difficulty is the use of what for a better name may be termed "a street air connection." An apparatus of this description is used at the Atlanta branch of the B. F. Goodrich Company. This device is of the simplest possible description. A post similar to a hitching post is planted at the edge of the sidewalk next to the curb. A quarter inch gas pipe is laid under the sidewalk and the end is brought up alongside of the post, this end terminating in a suitable valve. A simple stopcock is used which has a long lever which is so arranged that it may be locked in a closed position by means of a padlock. A union is, of course, provided by means of which a flexible hose is attached to the end of the pipe. It would seem that the idea might be further elaborated by using a box in place of the post which might contain the flexible tubing ready for use. By this course the tubing could be permanently attached to the pipe and would not be in danger of being lost or mislaid, as is the case when it is kept in the store or a separate locker.

The convenience of these free air posts is much appreciated by motorists.

### GREAT QUESTIONS OF AUTOMOBILE ENGINEERING.

#### Gear Box Position.

By Albert L. Clough.

In this article the writer will set forth the commonly accepted arguments relating to the advantages and disadvantages of the three principal methods of arranging the three elements of the transmission chain, namely: The unit power plant, consisting of engine and gear box rigidly related; the rear axle transmission unit, consisting of gear box and axle housing rigidly related, and the separate unit, or so called conventional arrangement, in which engine base, gear box and rear axle housing are all three independent structures.

Two varieties of the unit power plant exist. In the first the flywheel is mounted upon the front end of the crank shaft and the clutch and change speed gear is carried either in a rearward extension of the crank case itself or in a casing rigidly attached to the rear thereof. In the second. the flywheel is at the rear of the engine and it, the clutch and the change speed gear are contained either in an extension of the crank case having an enlarged portion of such diameter as to contain the flywheel, or the flywheel is supported but not necessarily enclosed in a yoke fastened to the rear of the crank case, to the rear of which the gear box is attached.

#### UNIT POWER PLANTS.

Among the arguments in favor of the unit power plant in general are the following: That its employment renders unnecessary any universal joint provisions between the engine and clutch and the gear box, and that the crank shaft and the gear shafts are held in constant relationship, if the casings are sufficiently rigid. This constancy of alignment secures efficiency in transmission and freedom from noise and wear. That the elimination of the universal joint, of one end wall of the gear box and one end wall of the crank case leads to greater lengthwise compactness. That some weight may be saved by these eliminations without sacrifice of strength. That the arrangement lends itself particularly well to the three point method of support, and that the adoption of this practice by freeing the supported structure from the liability of distortion may result in further weight reduction.

That there is less labor in assembling a unit power plant than in assembling a separate engine and gear box, that there is no risk of misalignment involved in the process, and that in case of damage to any part of the unit it is very readily detached from the frame and a new unit from the factory may be put in its place by ordinary mechanics while repairs are being made.

That pedals and control levers may be made a part of the unit power plant, which devices assemble with it and remove with it, if dismounting is required, separate mountinated, and exposed linkage being done away with. That the rear end of the unit is so far forward on the frame that a very long propeller shaft may be used and its angularity reduced to a very low value, re-

ings for these control members being elim-

angularity reduced to a very low value, resulting in very little work for the universal joint or joints thereof. That the portion of the unit enclosing the gears and clutch is far enough forward so as readily to be accessible by raising the floor boards and is not under the front seat and gasoline tank, as in some other designs.

Among the disadvantages cited are the following: That combining the engine base and gear box brings the centre of gravity of the car too far forward, so that, especially if only the front seat is occupied, the adhesion of the rear wheels to the road is seriously reduced and there may be an unusual tendency toward skidding. That, in order to render the combined crank and gear structure sufficiently rigid with the use of a reasonable amount of metal, its length is reduced to the limit, with the result that the contained parts are so crowded as to sacrifice accessibility and the possibility of the separate removal of the different elements.

As advantages of the first enumerated form of unit power plant, it is pointed out that the location of the flywheel in front increases the effective clearance of the car. That, as no enlargement of the housing has to be provided for the flywheel, and as its length does not include space for the wheel, it can be made much more rigid with the same weight than in the other construction. That if the extension for the clutch and gears is cast integral with the crank case there are no joints through which oil may leak or dust enter and the clutch is completely housed and may be effectively lubricated if desired.

The disadvantages cited against this construction are: That the front flywheel mounting brings the centre of gravity of the car toward the front more extremely than any other method of carrying the vehicle mechanism and detracts greatly from rear wheel adhesion, besides throwing excessive duty upon the front tires. That it is difficult to remove for repairs the clutch or parts of the gear set and that in event of the irreparable breakage of any part of the combined housing, the whole expensive and complicated structure has to be discarded. and further, that the subjection of the crank shaft to the heavy torque due to the energy stored in the flywheel is disadvantageous.

As points to the credit of the second form of the unit power plant it is asserted that the flywheel being to the rear of the engine the centre of gravity of the car is further to the rear than in the form just spoken of, and the rear wheel adhesion somewhat better. This is of special importance in the case of vehicles of long wheel base, in cars of which character the application of the unit power plant construction offers in general less advantage than in short cars. That all the advantages of oil tightness and perfect enclosure of parts attainable by the first method may be secured by this construction if it is integral in design.

To the discredit of this design it is urged that effective road clearance is less than in the first method. That the provision of the portion of the casing of large diameter required to house the flywheel is likely greatly to weaken the casting unless very liberal proportions are insisted upon, and the weight thereby prejudicially increased. That the heaviest element of the whole unit—the flywheel—comes nearly at the centre and weakest portion of the housing.

Regarding "bolted up" construction as applied to unit power plants, it is contended that this practice allows the separate elements to be readily removed as such, and that breakages of supporting members involve less expensive replacements; but in answer to these points it is claimed that it is difficult correctly to align the separate elements after removal, and that the machine work necessary to insure correct assembly involves expense which goes far toward neutralizing the advantages of the method.

Of the form of unit power plant in which the rear mounted flywheel is surrounded by a supporting yoke, but not completely housed, it is remarked that lubrication and dust exclusion are not so well provided for.

#### TRANSMISSION AXLES.

Leaving the unit power plant and considering the transmission axle or combination of the gear box and rear axle housing, one finds the following points of excellence brought forward in its favor: That it tends toward a very correct division of weight between front and rear wheels, and toward adequate driving wheel adhesion.

That it, in common with the unit power plant, eliminates one universally jointed connection required in the conventional arrangement, namely, that between the gear box and the axle.

That since the gear box is bolted rigidly to the axle housing there is always a correct relation between the through shaft of the gear set and the driven bevel of the axle. That the provision of adequate support for the pinion shaft is facilitated. That it shares with the unit power plant arrangement the advantage which accrues from the use of a long drive shaft, with slight angularity.

That by its use the torque transmitted through the universal joint arrangements of the drive shaft and the drive shaft itself never exceeds that due to the motor, even when the lowest gear is in use, for the reason that the multiplication of the torque is performed in the gear box at the axle to the rear of the drive shaft. That, consequently, a lighter drive shaft may be used and the universal joint or joints may be lighter for a given size of motor. That the consolidation of the gear set on the axle makes it possible to use gear combinations other than the conventional, and to drive the axle "direct" at more than one gear ratio.

That in common with the unit power plant the work of assembling the mechanism upon the frame is reduced on account of the fact that but two units are to be mounted, as against three in the conventional arrangement.

The corresponding disadvantages include the following points: That the attachment of the gear box to the rear axle housing increases the unsprung weight of the same and causes the tires to be subjected to heavier uncushioned shocks. That the weight added to the axle housing by the gear box is applied at its centre, its weakest point, and that more metal must be put into the housing to give it rigidity, and it must be trussed in a very substantial manner. The added weight of the axle housing further aggravates the uncushioned blows upon the tires. That the gear shifting linkages between the control levers and the gear box move when the rear axle moves, and that their correct design is more difficult on this account.

#### FRONT SWIVEL GEAR BOX HOUSING.

For the arrangement which is closely related to the above, and which combines the gear box with the rear axle, with the drive shaft housing between them-the whole forming a rigid unit—it is claimed that but one universal joint is required, or can be used, that being located at the front end of the gear box between the same and the clutch. It is further claimed that this arrangement possesses most of the advantages of the usual transmission axle arrangement, but adds but little to the unsprung weight appertaining to other systems. It is objected, however, that the use of the single universal is theoretically undesirable, but the answer to this is that the arrangement gives good results in extensive service.

#### THREE UNIT SYSTEM.

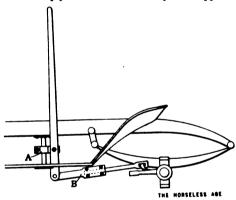
For the conventional three unit system it is claimed that the three units, being entirely separate, are readily removable singly, and that replacements are less expensive than the replacements of elements serving a double purpose. That each of the three elements being universally connected to its neighbors, no undue friction can occur between them, especially as they may be so arranged that the angularities of the power line are very small under all conditions of practical use. That there is no tendency toward crowding, as there is likely to be where a single housing is used for two purposes, and that the distribution of weight upon the chassis is more favorable to good

balance and rear wheel adhesion than with the unit power plant.

The objectors to the three unit system maintain that the cost of assembling the car is needlessly large under this plan of construction; that it is less compact and "clean" in aspect than it should be; that the gear box is likely to be placed inaccessibly under the front seat; that more stock, and hence more weight, is required for three complete housings than for two; that two or possibly three universal joints instead of one, or at most two, are required, with their attendant cost, inefficiency, necessity of lubrication and possible noise production; that the frame provisions for the mounting of two separate units are necessarily more expensive and heavy than those required for the mounting of a single unit, and that there are more places where oil may leak out or dust enter than in the combined systems.

#### Emergency Steering Gear.

One of the garages in New York city has its emergency wagon equipped with an emergency steering lever which can be quickly secured to the running board bracket, as shown in the accompanying cut. It consists simply of a lever with a pivot support



EMERGENCY STEERING LEVER.

adapted to be clamped to the bracket, and a short length of rod hinged to its shorter arm, which can be clamped to the fore and aft steering rod. By this means a man in the front seat or on the running board can steer a car whose steering gear has been disabled in any way.

#### The Studebaker-E-M-F Tangle.

The Studebaker Automobile Company last week, following the announcement of the E-M-F Company that the exclusive distributing agency agreement with the Studebaker Company had been annulled, ran an advertisement in several metropolitan papers to the effect that they were still selling and would continue to sell E-M-F 30s and Hudson 20s. From Detroit it was learned that the Studebaker holdings in the E-M-F Company amounted to a little more than 35 per cent., and that the rest of the stock in the company was owned by Chas. L. Palms, Dr. J. B. Book, J. B. Gunderson, William T. Barbour and Walter E. Flan-

ders, of Detroit, and A. D. Bennett, of Port Huron, Mich. It is stated that disagreements first arose toward the end of November, and while the trouble was at its height fancy prices were offered for E-M-F stock by brokers, but none was sold, except by some Port Huron holders. The contract with the Studebaker Company, it is stated, called for 15,200 E-M-F cars and 14,800 Flanders 20s. It is stated that the Studebakers never put ony money into the E-M-F Company directly, but bought out the holdings of William E. Metzger and B. F. Everitt in the company.

### Chalmers-Detroit and Hudson Companies to Separate.

An important change in the operating plans of the Chalmers-Detroit and the Hudson Motor Car companies is to be effected gradually during the next six months.

Beginning not later than July 1, 1910, these two companies will be owned and operated separately. Heretofore they have been largely owned and controlled by one group of men—the controlling group in both companies consisting of Hugh Chalmers, E. R. Thomas, R. D. Chapin, H. E. Coffin, F. O. Bezner, Jas. J. Brady, Lee Counselman, J. L. Hudson, R. B. Jackson and Geo. W. Dunham.

Next spring three of the present Chalmers-Detroit officers, namely, Messrs, Coffin, Bezner and Chapin, will assume control of the Hudson Motor Car Company, while Messrs. Chalmers, Counselman, Brady, Ford and Pfeffer will continue with the Chalmers-Detroit Motor Company, Mr. Chalmers as president and general manager, Mr. Counselman as vice president and assistant general manager, Mr. Brady as second vice president and factory manager, H. W. Ford as secretary, and C. A. Pfeffer as treasurer. Mr. Dunham, the chief engineer of the Hudson Motor Car Company, will assume a similar capacity in the Chalmers-Detroit Motor Company.

The new officers of the Hudson Motor Car Company will be: J. L. Hudson, chairman of the board; R. D. Chapin, president: H. E. Coffin, vice president; F. O. Bezner. secretary; R. B. Jackson, treasurer and general manager; E. C. Morse, sales manager. Mr. Jackson, who has been treasurer and general manager of the Hudson Motor Car Company since its inception, will remain with the Hudson Company.

This change in the officials of the two companies was made possible by the exchange by Messrs. Chapin, Coffin and Berner of their Chalmers-Detroit holdings for Mr. Chalmers' Hudson holdings and a cash bonus. Thus Mr. Chalmers acquires control of the Chalmers-Detroit Motor Company, and Messrs. Chapin, Coffin and Berner acquire control of the Hudson Motor Car Company.

R. I. Macklin, florist at Marshfield, Wis, has purchased a Maxwell runabout with special body for deliveries.

### DESCRIPTIONS OF NEW VEHICLES AND PARTS.

#### The Herreshoff Car for 1910.

The Herreshoff Motor Company, of Detroit, Mich., have just made announcement of their second year's product, a car, they say, intended as a smaller edition of a high priced machine. The unit type of construction is followed. The motor, clutch and transmission constitute one unit, and the driving shaft, bevel gears, differential and rear axles a second unit. This arrangement minimizes the chance of misalignment of parts and conserves the power developed, delivering a very high percentage of the motor output to the rear wheels. The power plant is hung low in the subframe, which gives practically a straight line drive, reducing wear and preventing loss of power.

#### THE MOTOR.

The motor is of a four cycle, four cylinder, water cooled type, with cylinders cast in pairs, with integral water jackets. The cylinder bore is 33% inches and the stroke 3¾ inches. The inlet and exhaust valves are of large diameter, interchangeable and are located on one side. This construction operates to reduce the loss of heat in the water jackets and to conserve the power, since the incoming gas helps to cool the exhaust chamber. The valves are operated by very hard steel cams, on one cam shaft, which is mounted on imported ball bearings. The inlet and exhaust manifolds are large and have no elbows or corners for the collection of gas.

The crank shaft runs on three imported ball bearings; it is a drop forging, ground to size, and balanced as a unit and with the flywheel assembled. The connecting rods are of drop forge steel of I section. The caps are doweled and held in place with chrome nickel steel bolts. The crank

pin bearings are of die cast babbitt. The upper ends of the connecting rods are securely clamped to hollow wrist pins which have their bearings in the pistons.

The carburetor is of the float feed automatic type, the gasoline feed being regulated by a graduated needle valve. The gas is controlled by a hand lever on the steering wheel and by a foot accelerator. The gasoline tank is placed under the driver's seat, the gasoline being fed by gravity to the car-

vided, viz., a high tension Bosch magneto, operated with a fixed spark, and a storage battery and four unit coil and timer. These two systems are controlled by a switch in easy reach on the coil box, located on the dash.

The magneto is located in the left hand side of the crank case and is held in position by a clamped band. It is driven from the crank shaft gear through an idler gear. A flexible coupling is provided in its driv-



1910 Touring Car.

buretor. On the runabout and tourabout types an air pump is provided for pressure feed for use on hills.

The vertical type radiator is of large capacity. Drawn brass pipes carry the water to and from the cylinders, and their large size facilitates the thermo circulation. The fan behind the radiator is mounted on ball bearings, and driven by a V shaped belt from a pulley, keyed to an extension of the cam shaft. An easy adjustment makes it possible to tighten the belt if necessary.

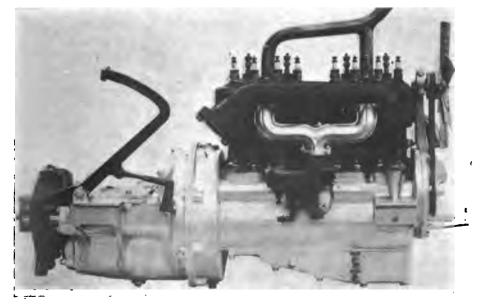
Two independent ignition systems are pro-

ing shaft, which shaft is mounted on imported ball bearings. All high tension cables are carried in insulated brackets. The timer in connection with the storage battery circuit runs on ball bearings and is driven from the magneto driving shaft by spiral gears.

The lubrication of the motor is by a constant feed system and operated by a selfcontained gear pump. A reserve reservoir is located underneath the crank case proper, from which the oil is pumped through a copper tube to the sight feed on the dash, from which it is fed by gravity into the two compartments of the crank case, where a constant level is maintained. The lower tips of the connecting rod bolts dip into this oil and throw it to all parts within the case and pistons. A strainer is provided in the reserve reservoir, so that foreign substances are not drawn into the system. The gear pump is driven by the same spiral gear which drives the timer.

#### CLUTCH AND TRANSMISSION.

The multiple disc type of clutch is used. The discs are steel on steel and operate in a bath of thin oil. The driving discs have projections on their outer periphery, which fit into grooves on the flywheel. The driven discs have projections on their inner periphery which engage in grooves on the clutch driving spider. The friction between the driving and driven discs is maintained by the pressure of four coil springs which are carried on a spider. These springs are accessible through a hand hole in the clutch case, and it is only a few minutes' work to adjust them if necessary. The clutch driving spider is secured to a hexagon shaft



HERRESHOFF POWER UNIT.



FRONT VIEW OF MOTOR.

which engages the transmission sleeve, through which a hexagon hole is broached. The clutch is disengaged by a single pedal which also operates the service brake. Owing to the system of leverage used only a light foot pressure is required to operate this pedal.

The change gear is operated on the selective principle. The gears are made of nickel steel, properly heat treated. The face of the gears has been increased to insure abundant strength and facilitate meshing. The bearings in the transmission are of imported ball type. The transmission case is of aluminum and well ribbed. It is shaped to meet the rear end of the crank case, to which it is securely bolted.

The gears operate in a bath of lubricant. There are three speeds forward and one reverse. Gear shifts are made with a hand lever at the driver's right, operated through the usual type of "H" plate. Locking devices are provided which absolutely prevent more than one set of gears meshing at one time, and an additional device retains the gears in mesh when so placed. The gear case is rendered accessible by lifting the floor boards.

The rear shaft of the transmission carries the transmission brake drum, to the hub of which is secured a coupling in which a square hole is broached. Into this the front end of the propeller shaft engages, through a spherical square. This forms universal connection, which takes care of the disalignment due to spring action. The entire driving mechanism is encased in a concentric tube. To the upper end of this concentric tube a spherical ball is attached which is free to rotate in any direction in a casing, securely attached to the frame cross mem-

ber. The lower end of the concentric tube is rigidly bolted to the bevel gear housing on the axle.

#### AXLES.

The rear axle is of a semi-floating type. Timken roller bearings are used throughout. The bevel gear housing is a malleable iron casting with a removable cover at the back through which the entire differential, with bevel gear, may be removed. The axle tubes are tapered and securely riveted to the housing at one end and pinned and brazed on the brake spiders at the outer end. A truss rod is provided to prevent sagging. The differential is of the bevel gear type. Adjustments are provided so that the gears may always be kept in proper mesh. The axle shafts are of heat treated steel. The ends which fit into the differential housing are hexagonal. The outer ends are tapered, and to them the wheel hubs are secured with castellated nuts.

The front axle is a single piece drop forging of I beam section. The knuckle pins are hardened and ground, and provisions are made for proper lubrication. The front wheels run on Timken bearings. The steering cross rod is behind the axle, and the side steering connection passes over the axle.

#### FRAME AND SPRINGS.

The frame is of channel section pressed steel, arched above the rear axle to provide increased spring action with the body of the car hung low. There are four cross members, well secured to the side rails with substantial gussets. A rigid sub-frame carries the power plant. The semi-elliptic type of spring is used. The rears are shackled at either end and do not transmit the draught from the axle to the frame.

#### BRAKES AND STEERING GEAR.

The car is equipped with two sets of brakes. The service brake acts on the rear transmission shaft and is operated by the pedal. The brake drum is 6½ inches in diameter by 2 inch face and revolves at engine speed when using the high gear. The gear reduction in the rear axle is 4½ to 1, and this brake is therefore very powerful. The emergency brakes act on drums attached to the rear wheel hubs. They are internal expanding and lined with a cop-



REAR VIEW OF MOTOR

per-asbestos lining not destroyed by heat. The service brake also has this same lining. The emergency brake drums are 10 inches in diameter, with an effective face of 2½ inches. A substantial hand lever, with ratchet stop, operates the emergency brakes, and is, in all positions, within easy reach of the driver. In both systems of brakes provision is made for adjustments.

The steering gear is of the worm and sector type. The steering wheel is 16 inches in diameter, the spider being of aluminum. A small lever for the throttle control and also a second lever for the timer control are placed above the wheel in convenient positions. The steering post is well anchored to the dash, and the whole mechanism is rigid and substantial. Provision for taking up wear in the worm is provided. The side steering connection has a ball socket at either end into which the steering lever engage. Shock absorbing springs are provided in the front end of the connections so that sudden shocks from the road are got



REAR AXLE.

smitted to the steering gear proper, working joints are covered with leather ts which are packed with lubricant.

BODIES AND EQUIPMENT.

election may be made from three types podies—touring, tourabout and runabout. I dash and body trimmings are of Cirian walnut. The coil box is made of same material to match. The touring seats five people, the tourabout four and runabout three. The rumble seat at the of the runabout is securely attached to tool box, and sets well away from the it seat. The equipment includes two e acetylene gas lamps with Prest-Otank, two square dash lamps and a stantial tail lamp. A high grade deep

seventh street, New York city, have three new models for 1910, the chasses of which will be first shown at the Grand Central Palace Show. These chasses have been received direct from the London Olympia Show. Two of these are four cylinders and the third is a six. One "four," of 10-12 horse power (French rotary), has cylinders cast en bloc. They are of 2¾ inch bore

American roads, and its motor has probably the longest stroke in proportion to its bore of any car that will be shown here this season. The bore is 4½ inches and the stroke 6½ inches. Besides the long stroke feature the car has a straight front axle with 10 inch road clearance, and 128 inch wheel base. The cylinders, being cast in pairs, have spacious water jackets and are cooled



SIDE VIEW OF RENAULT CHASSIS.

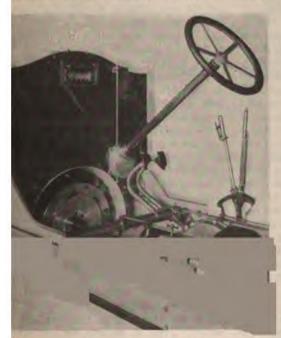
ed horn is provided. A full quota of cel plated tools will be found in the tool ; tire pump, tire repair outfit and jack included.

nless otherwise specified, 32x3½ inch helin flat tread tires on Goodyear quick tchable rims will be furnished on all tels. Customers may choose, however, rgan & Wright, Goodrich or Diamond s of the size specified.

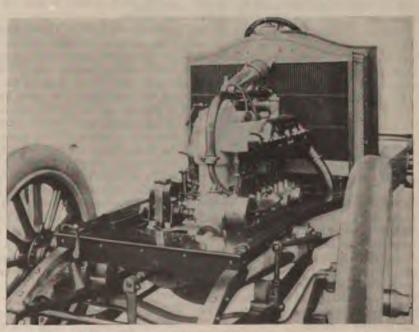
#### Renault 1910 Models.

he Renault Frères, whose American iquarters are at Broadway and Fiftyand 4½ inch stroke. The wheel base of this car is 99 inches. The other "four," of 25-35 horse power, has cylinders cast in pairs, with 4½ inch bore and 6½ inch stroke. It has a 128 inch wheel base. The six cylinder car, of 18-24 horse power, has cylinders cast in triplets, with 2¼ inch bore and 4½ inch stroke. The wheel base of this car is 120 inches. Except for bore and stroke, number of cylinders and the wheel base, these cars are all built along the same general lines. The four cylinder, 25-35 horse power American Special has been designed and constructed especially for

by the thermo-siphon system, which has been used by the Renaults from the beginning. The water connections are extra large, much larger than those generally used on American cars using the same systems. The valves are all on one side and operated by a single cam shaft. The inlet and exhaust manifolds are both on the same side, but the carburetor is located on the opposite side and set very low. Connection with the inlet manifold and carburetor is made by means of a long curved pipe of liberal proportions, which is carried up and over the cylinders between the two members or cast-



E PORTION OF CHASSIS, SHOWING FLYWHEEL FAN, GEAR BOX AND BRAKE.



FRONT VIEW OF CHASSIS, SHOWING MOTOR, RADIATOR AND MAGNETO.

ings and then down to the inlet manifold. Each set of cylinders has its water outlet connection over the centre cylinder, which is bound to be the hottest. The crank shafts are machined from a solid ingot of special steel and have three plain bearings. The main bearings are of phosphor-bronze lined with an anti-friction metal. The cam shaft is also turned from a solid bar, with the cams formed integral, and has plain bearings similar to those on the crank shaft.

These cars are all equipped with the well known Renault type of tubular radiation located back of the motor, forming the dash. The hood is hinged from the radiator front and fastens to the sill plate above the frame and the tight pan, underneath the motor. forms an air shaft through which the air is drawn by the fan shaped flywheel. The rim of the flywheel has pressed steel blades attached to it. All parts of the car are lubricated from the oiler, which is inside the radiator, feeding by gravity; one pipe leads to the front bearings, one to the centre bearing, one to the flywheel bearing, one to the transmission case, one to the differential and one to the self starter when fitted to the car. A knob placed in front, on the side of the crank case, makes it possible to drain the crank case of oil without getting under the car to do so. This same knob when placed in the "communication point" opens the partition in the crank case so as to equalize the level in all. When the car is going up hill, the partitions being closed, the oil does not go to the rear cylinder, but remains at an equal level in each. The same knob when placed in the "overflow" point permits of draining off excess oil. Ignition is by high tension magneto, no coil or battery being used. There is no spark central lever.

#### The Swan Handy Curtain Clip.

This handy little device, which has been placed on the market by the Detroit Auto Shield Company, of Detroit, Mich., consists of a clip by which a rain curtain can be attached to a wind shield, thereby enclosing the driver's seat for protection from storm and wind. The curtain can be easily attached from the seat. The clip is made of spring brass and can be easily attached





to the curtain by anyone. It is attached to the curtain by two little plaits which go through a slotted metal washer, holding the fabric between the washer and clip. This arrangement holds the fabric without any undue strain in one place. The clip itself is formed to a shape smaller than the bead of the wind shield, and when pressed over the edge of the wind shield holds the curtain securely in place.

#### The Warren-Detroit.

The Warren Motor Car Company, of Detroit, Mich., announce for the season of 1910 a 26-28 horse power, four cylinder model. This new car follows approved, up-to-date lines in its design. It is built primarily as a roadster, although other styles of bodies will be furnished. A number of line drawings have been furnished, and this allows of quite a detailed description.

#### THE MOTOR.

With its cylinders cast en bloc and valves all on the right side the motor is very compact for its bore and stroke, which are 4 and 4½ inches respectively. The cylinders are cast with water spaces between and with the top of the jacket open for core support and jacket cleaning. The crank case is in two parts, of which the lower serves as an oil pan. The crank shaft has two bearings of Parsons white brass. These bearings have caps of aluminum, which are ribbed to ensure stiffness.

Four rings are used at the top of the pistons and three oil grooves are turned in the bottom. The hollow wrist pins are secured by a through screw locked by a cotter pin. A slot in the top of the rod permits oil to reach the top of the pin bearing, while a hole in the bottom of the pin feeds the bottom side.

The cylinders and crank pins are lubricated by splash. The oil level in the case is maintained by a plunger pump. Referring to the section of the engine, A is the piston, carrying the usual ball valve. Oil is taken in through strainer B. The downward movement is produced by eccentric C and the piston is raised by the spring surrounding it. The oil is discharged into the timing gear case, from which it flows over dam E when the proper level is reached. After filling the crank case to the required height the overflow returns to oil chamber F. The oil supply may be replenished by removing cap D, which is held in place by the split central pin.

The crank shaft is a drop forging with 2 inch diameter pins and 134 inch bearings. Its rear end is flanged and carries the flywheel, which contains the leather faced cone clutch. Three bearings are provided for the cam shaft. The cams are ground in place on the shaft. The tappets are of square section with rounded ends. Valve clearance is adjusted by set screws. Cooling is by water, using a vertical tube radiator and a centrifugal pump. The fan is driven by a flat belt. A dual system of ignition is provided. It consists of a Volta high tension magneto mounted at the rear of the pump, a set of dry cells for reserve current supply and a single coil in a mahogany box on the dash. A kick-out switch is provided. Fuel is supplied to a Gould carburetor from a large tank under

#### THE CLUTCH.

The clutch has a 21/2 inch face and is of liberal diameter. Easy engagement is

secured by springs under the leather. These springs, lettered C in the clutch assembly, are curved so that when the clutch is disengaged they press the leather outward. The distance they can press it away from the cone is regulated by adjusting nut B on stud A. The clutch runs on a Parsons white brass bushing when disengaged, and the spring pressure is taken by a ball thrust bearing. A double sliding joint connects with the change gear. The throwout collar is of bronze working in a hardened steel groove. The clutch pedal may be adjusted to its proper position by screws A and B.

#### THE CHANGE GEAR.

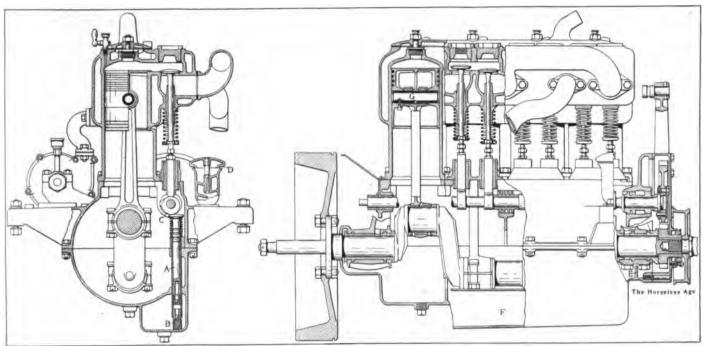
The change gear case is also of aluminum, split horizontally. It gives three speeds and a reverse on the selective system. The gears are of high carbon steel, carefully hardened. The shafts are of cone steel, carefully ground. The shaft for the sliding pinions has four integral keys. Parsons white brass is used for the bearings. A sliding finger, operated by a hand lever working in an H quadrant, shifts the gears in the conventional manner. Referring to the assembly, shafts A and B are locked fast to the case; shifting forks D and E slide over them. Plate C is also fastened to the case. A hole in C contains ball F. which locks either D or E when the other is moved from the neutral position. The gears are located in the neutral position by balls, such as G, carried in the hubs of the shifter forks.

#### RUNNING GEAR.

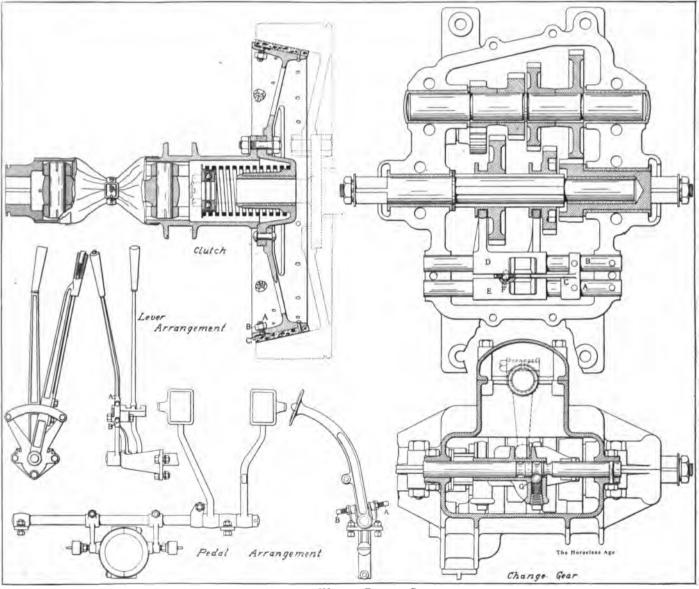
The rear axle is of the semi-floating type, with bevel driving gears of a ratio of  $3^{1/2}$  to 1. The torque is taken on the casing for the propeller shaft. This shaft is squared into a Spicer universal joint at the rear of the change gear. Hyatt roller and ball bearings are used. The front axle is an I section forging. The knuckles are cross connected in front of the axle, and the connection to the steering gear is brought above the axle on the right hand side. Cup and cone ball bearings are used in the front wheels.

The front springs are of the semi-elliptic type, 36 inches long and 13/4 inches wide. At the rear the popular three-quarter elliptic spring is used, the dimensions being 45x13/4 inches. The frame is a typical pressed steel construction. The side members ars 3½x1½ inches, of a special stock sh inch in thickness. They are dropped just in front of the rear axle. Motor and change gear are carried on a channel subframe, which is joined to the main frame by two flat sheets of steel which serve to complete the dust pan.

Both contracting and expanding brakes are on the rear axle. The rocker shafts are placed one in front of the other instead of being arranged concentrically, as is the usual practice. The hand lever A for operating the emergency brake is placed between the change gear quadrant and its sector. Pawl B engages the ratchet as



Моток.



PARTS OF WARREN-DETROIT CAR.

shown. This is somewhat simpler than the usual arrangement. The steering gear is a worm and sector fitted with a 16 inch hand wheel with mahogany rim, Spark and throttle control are mounted above the wheel. Brakes, clutch and gears are controlled by the usual arrangement of levers and pedals, while the motor is accelerated by a foot button.

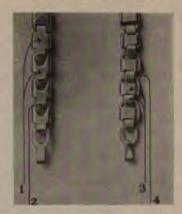
BODY AND GENERAL DIMENSIONS.

The seats are low and divided; they are upholstered with blue-black pebbled grain leather. The standard color is a royal blue, striped in red. The gear is a quiet red, striped with black, and the fenders are enameled black. The steps are of sheet metal.

The wheel base is 110 inches and the tread 56 inches; 32x3½ inch tires are used on the roadster, and 33x4 on the demi-tonneau. Both front and rear wheels have twelve 1¾ inch spokes. The equipment includes a full set of large gas and oil lamps, horn, tools, tire repair kit, pump and jack.

#### Holsman Delivery Wagon.

The accompanying cut shows a new style delivery wagon brought out by the Holsman Automobile Company, Monadnock Building, Chicago, for 1910. The mechanical features are substantially the same as on the 1909 models. Among the special features of Holsman delivery cars are the removable power plant, and the fact that the entire floor space is available for load carrying purposes. The Holsman Company made a distinct change in their various models in 1909, accomplishing an absolutely direct drive on both high and low speed, and also bringing forth the only all ball and roller bearing motor on the market.





r, Flat surfaces lying against the tire; z, portion of connecting link curves, extending away from the tire; 3, inside of chain coming against the road; 4, link of chain passing through another link inside a little box.

Four views showing the last movements used in fastening.

FOX TIRE CHAIN AND FASTENER.

#### The Fox Anti-Skid Chain.

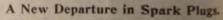
A novel tire chain, which is claimed by its manufacturers to not only absolutely prevent skidding but wear for upward of 3,000 miles, has just been placed on the market by the Fox Metallic Tire Belt Company, Broadway and Sixty-eighth street, New York. For chains are made of flat links of steel stamped from especially manufactured tool steel. These links are bent and interlocked, making broad bands, flat on one side, but with small square projections on the other side. The flat side goes against the tire. The flat connections between the links do not touch the tire, curving away and upward to the interlocking point. Nothing except a broad, flat, smooth metal surface touches the tire.

The wearing surface of the Fox chain, or the part which comes in contact with the road, is a series of flat discs about 1 inch square. They are like the treads on a studded anti-skid tire, but being square instead of round, are claimed to have better gripping power.

The steel links of the Fox chain are shaped like little square boxes with the ends hooked together instead of being shut up. These ends, instead of extending out flush with the wearing surface of the chain, are sunk lower, and the curve of the interlocking point brings them still further away from the road surface.

These links curve under the flat road treads, and are between them and the surface of the band which fits against the tire. In other words, the connecting portions of the links are inside the box and protected against road wear or the impact of road obstacles. Moreover, they are broad and flat, and they offer a far greater wearing surface to each other than do round links.

The flat links cross chains are fastened to flat steel wire chains which extend around both sides of the tire near the rim. These are far removed from the road surface and act as a strong protection to the sides of the tire when driving in frozen ruts. The ends of these side chains are brought together and locked by the Fox patent chain clamp, a simple fulcrum lever terminating in a powerful clasp. This fulcrum lever slips easily through a link of the side chain, one easy motion tightens the whole and clasps the clamp in place. By moving the clamp up one link all slack occasioned by stretching or wear can most easily be taken up. In applying the chain no tools are necessary and the wheel need not be jacked un



The American Machine Company, of Ean Claire, Wis., have been incorporated with a capital stock of \$50,000 to manufacture automobile accessories. The company controls the patent rights of the Indian spark plus. This plug is insulated with pipe stone, which when chemically treated is claimed to become an absolute non-conductor. It is claimed that this material can be heated to a white heat, and then be thrown into for cold water without cracking it or otherwise affecting its insulating qualities.



HOLSMAN DELIVERY WAGON.

#### isconsin Manufacturing Company's Two Cycle Motors.

e Wisconsin Machinery and Manufacg Company, Milwaukee, Wis., are ofg for the 1910 trade a line of valveless cycle motors in sizes of 16, 25 and 35 power. The accompanying cuts illusthe four cylinder 4½x4½ inch motor leasure and commercial vehicles.

e cylinders are cast separately. The set port top is three-quarters of an above low piston position and the top of the third or transfer port is half an above low piston position; the intakes nine-sixteenths of an inch open when siston has reached its highest point. compression space has round top corand with the cylinder full of pure, air and the crank turned at about 80 ations per minute the gauge shows 74 as compression. The exhaust chams completely water jacketed. Provision made for relieving the compression eans of relief cocks.

pistons are 53/4 inches long, and have three-eighths of an inch rings at the with three-sixteenths of an inch lands en, and one three-eighths of an inch at the bottom. After many trials of ent deflector forms and placing, the tral face with rounded corners against ylinder wall, reaching the bent radius the port opening, was adopted. The tor is cast on the piston top, is 13% s high and directs the incoming gases st the cylinder head. The piston top deflector are hand finished by filing, ing and polishing with emery cloth, to avoid pre-ignition. The piston are turned eccentric, one-eighth of an thick, cut at 45 degrees, and held by a sixteenths of an inch pin from turn-

e connecting rods are steel drop forgof I section, and are 93% inches from to centre. The piston pin is of 11% s diameter, of steel, hardened and id, and is clamped to the upper end e rod with a seven-sixteenths of an

inch clamp bolt passing through the side of the pin. A five-eighths of an inch hole is drilled the whole length, through which the pin is oiled from the cylinder coilers. In the centre of the bearing journals oneeighth of an inch holes are drilled for leading oil to the phosphor-bronze bearings. These bearings are of extra large proportion. The connecting rod lower ends are capped, the caps being held by two sevensixteenths of an inch bolts, double nuts, split pin retained. The rod boxes are of die cast white metal. Each piston and connecting rod is machined to a given weight, so that they can be interchanged without throwing the motor out of balance.

The crank shaft is made from open hearth steel with five main journals of 15% inches diameter. The two front crank pins are 180 degrees apart and the two rear pins are also 180 degrees apart and are set 90 degrees behind the front pair. The firing succession is 1, 3, 2, 4. The centre bearings are 25% inches long and are plain half boxes with caps and liners. The main or side bearings are 434 inches long and flanged. The front bearing is solid; the rear bearing is made in halves. All bearings are die castings of white metal. The shaft is mechanically balanced by steel cast balance weights held to the shaft by means of slots and tongues and retained by three-eighths of an inch bolts through the weights and the shaft

The crank case is cast of aluminum alloy. The motor base has four long supporting arms 3 inches wide, designed to hang on top of the engine frame or main frame. The cylinder face is bolted with four one-half inch studs directly to the motor base, without packing. The oil base is provided with four large hand holes for inspecting the connecting rods. Provision is made for draining the oil. Attention is called to the enclosing of the gears which drive the water pump, oiler and commutator on one side and the magneto on the other, in an oil and dust tight case, cast integral with the crank case. These gears have fine pitch teeth and are of phosphor-bronze. The exhaust

manifold pipe enlarges as it nears the muffler pipe, this taking care of the expansion of the exhaust gases. The intake pipe manifold is cast of brass. Both manifolds are fastened with four steel spanners.

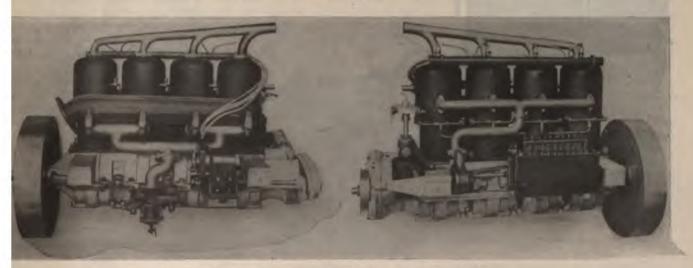
The flywheel is bolted on the crank shaft flange, is of 17½ inches outside diameter and designed to fit a 15¾ inches diameter, 12½ degrees and 2½ inches face standard cone clutch, but motors can be furnished with flywheel to suit any transmission device. The ball bearing fan is of 16 inches diameter and is driven from the magneto shaft by a three-quarters of an inch flat belt; it has six aluminum vanes 4 inches wide with a ring in one piece, and makes 2½ turns to one of the crank shaft. The fan bracket is mounted on the first cylinder and is adjustable for tightening the belt.

Lubrication is by mechanical oiler with nine feeds of the valveless double plunger type, forcing oil from the sight feed to the delivery points. The oiler is set on the motor base and is driven by a horizontal half time shaft. The cylinder wall is oiled from both sides. Grooves are turned in the piston and piston rings, into which oil is forced during the upward and downward travel.

The motors are fitted with two absolutely independent ignition systems. A Bosch high tension magneto and a Connecticut timer are used. The magneto bracket is designed to accommodate either a Bosch or a Remy high tension magneto, or a dual ignition magneto of any make.

The Wisconsin valveless motor is built in two, three and four cylinder models of the same bore and stroke, using the same cylinder casting. The three models are claimed to give 34 horse power, 25 horse power and 16 horse power, respectively, all at 1,200 revolutions per minute. The speed ranges from 200 to 2,000 revolutions per minute.

The Wisconsin Machinery and Manufacturing Company are also placing on the market a four cyclinder, four cycle, water cooled 4x4 inch motor, with cylinders cast "en bloc," which will be described in another



Two Side Views of Wisconsin Four Cylinder, Two Cycle Motor.

#### The Ewing Motor Cab.

The Ewing Automobile Company, whose factory is located in Geneva, Ohio, have recently made their 1910 announcement. They will continue the manufacture of the cab or town car which they brought out a year ago with various minor changes, as will appear from the following description:

The running gear frame is of pressed steel, of five-thirty-second inch stock, and 41/2 inches depth of section from end to end. The frame is considerably narrowed in front, being 26 inches in width between the front wheels, while the rear portion is 34 inches in width, and is raised 5 inches above the front level. The bend in the frame member is very long, and is reinforced by widening the flanges. The frame is supported on semi-elliptic front springs 36 inches long by 2 inches wide, placed directly underneath the frame members, and three-quarter inch elliptic rear springs 42 inches by 2 inches wide. The top quarters of these springs are provided with scroll ends, while the lower spring member is rotatively perched on the rear axle, and linked to the frame in front. The wheels are 32 inches in diameter, and fitted with 4 inch tires. The wheels are fitted with two point ball bearings containing one-half inch and three-quarter inch balls in front and rear respectively.

The motor is of the four cylinder type, of 3% inch bore by 4¼ inch stroke. The cylinders are cast in pairs with integral water jackets with a large opening on top, which is closed by a cover plate. The cylinders are finished by boring and reaming, while the pistons are finished by grinding. The latter are provided with four packing rings, all of them above the piston pins. The piston pins are of three-quarter inch diameter, hardened and ground, and are fixed in the piston bosses.

The connecting rods are steel drop forg-

ings. The upper ends are non-adjustable, while the big end bearings are of the marine type. The piston pin bearing is bushed with phosphor bronze, while the big end bearings are bushed with die cast half bushings of Parsons white bronze. The connecting rod caps are originally forged together with the rods themselves. They are then sawed off, and one-eighth inch liners are placed between the rods and caps. The crank shaft is an integral forging, with all its bearings of 15% inches diameter. It has three main bearings, and is finished by. grinding all over. The flywheel is secured to an integral flange. The valves are located all on one side, and are interchangeable. They are made of drop forgings. The cams and cam shafts are integral and finished by grinding. The valve lifters are slightly offset with respect to the cams, which is claimed to give them a slow rotary

Ignition is effected by sparks produced by a magneto. Either a true high tension magneto, with both a high tension and low tension winding on the armature, or a low tension magneto with step up coil is furnished at the option of the purchaser. The spark time is fixed, occurring about 20 degrees ahead of the top dead centre. It is stated that the effectiveness of the spark varies somewhat with the speed of the motor, and this provides a certain automatic advance of the firing time.

The lubricating system is a combination of the splash and mechanical circulation system. The two crank pits are kept filled with oil to a certain height by means of overflow pipes through which any excess of oil drains down into an oil tank below the crank chamber. The crank arms, crank pins and connecting rod caps are drilled with three-sixteenth inch holes, and are provided with oil catchers to carry oil from the main journals through the crank pins

and connecting rod bearings. A mechanically driven pump draws oil from the oil tank, and forces it through three leads to the three main bearings of the crank shalt. The oil working through these bearings accumulates in the crank pits. By opening an oil cock the driver may at any time assure himself that the oil is properly circulating. The oiling system is claimed to be reliable in action, and very economical of oil

The cooling water is circulated by a cestrifugal pump, which is coupled to the magneto shaft. The radiator is flexibly supported by two trunnions on the sides and a stay rod on top.

The clutch is of the multiple disc type, and runs in an oil bath formed in the flywheel. Both the discs and the casing of the clutch can be removed without disturbing any other parts. The change gear is of the selective sliding type, giving three forward speeds and one reverse. It is connected to the clutch by means of a universal joint. The pinions of the change gear are cut from chrome nickel steel with 6-8 pitch teeth, and 7/8 inch and 1 inch width of face. They are oil tempered. The gear shifting quadrant is located in the middle of the car, and is secured directly to the aluminum gear box. The latter has a large hand hole cover, which when removed permits of a thorough inspection of the gears.

The drive to the rear wheels is by shaft and bevel gears. The propeller shaft is of 118 inches diameter, and is carried in a heavy steel tube of 234 inches diameter, which serves as a torsion rod, the rear end of the tube being pinned and brazed into the hub of a flange bolted to the beed gear housing. This flange is bored out to receive a New Departure double ball bearing, which when the drive is assembled is located directly back of the driving bevel pinion. The front end of the propeller shaft sleeve is pinned and brazed in a flanged hub from which run diagonal braces to lugs integral with the rear axle housing. This foward flange is also bored to receive a New Departure ball bearing which supports the front end of the propeller shaft. At the forward end of the propeller shaft there is a universal joint which has a spherical seat secured to the rear cross member of the frame. The differertial gear is of the bevel pinion type, containing four pinions. The hubs are carried in two point ball bearings, which can be adjusted to insure correct mesh of the driving gears.

The rear axle driving shafts are open hearth steel forgings, squared at their inner ends to receive the square broached hubs of the differential side gears. Forged integral with the outer ends of the driving shafts are the hub driving clutch plates. The live axles are 1½ inches in diameter, heat treated, and so arranged that they may be withdrawn from the car, after the hub caps are removed, without disturbing the



EWING TAXICAB.

other parts. The wheels are carried on the outer ends of the rear axle sleeves, thus giving a so called floating rear axle. The driving gear housing consists of two malleable iron castings, which are joined in a vertical plane, being faced off and held together with eight steel bolts. The rear axle sleeves are pinned and brazed into these malleable iron castings. This construction is said to be of such strength that no truss rod is needed.

The front axle is an I section drop forging with integrally forged steering heads. The pivot pins are seven-eighth inch in diameter, hardened and ground, and work in hardened and ground steel bushings forced into the bores of the steering fork, the pins being fastened in the knuckles. The forks have an opening of 4 inches.

A pair of internal expanding bronze shoe brakes are applied to drums on the rear hubs. These drums are 12 inches in diameter, and have a 2 inch face. The expanding members consist of two semi-circular shoes, which are pivot supported at one end and provided with flat cam faces on the other end. Normally the two shoes are drawn together and out of contact with the drums by means of two coiled springs. The braking surface is thus a bronze steel surface, and a particular bronze composition is used, which is said to work without oil without scratching or cutting. This composition consists of nine parts of copper to one part of tin. The service brake is located on the change gear shaft back of the gear box. It is to inches in diameter by 3 inch face. The contracting member consists of a bronze ring, which is drawn tight onto the drum by means of a rocker shaft carrying two face cams. The service brake is operated by a pedal, while the emergency brake is operated by a hand lever and equalized by a steel cable construction.

The Ewing cab is equipped with left side control. The steering column is located on the left hand side, and the gear change lever and brake lever are in the centre of the car. The other control members include the usua! pedals for the clutch and the service brake, and a small foot lever for accelerating the engine speed. The latter is operated by a sidewise motion of the foot. The steering gear is of the worm and sector type. The throttle is controlled by a ratchet retained hand lever on top of the steering wheel.

The car is provided with either a landaulet or brougham body. The landaulet body, which is the usual type for taxicab services, is built with a 24 inch projection over the driver's seat, the top breaking back of the rear frame of the door, which gives a particularly rigid construction. Either a double driver's seat is provided or a single seat, and half the space in front left for carrying baggage. When the car is intended for private use it is fitted with either a landaulet or brougham body, with the top extending out to the dash and fitted with a glass front.

#### St. Louis Chauffeurs to Form Union.

The death of a pedestrian who was run over by an automobile is said to have given the first impetus for the organization of a chauffeurs' union in St. Louis, which is now under way. The object is to keep inexperienced men and those under twenty-one years of age out of the ranks of professional drivers. C. F. Faulkner, an agent of the St. Louis Taxicab Company, is doing the organizing work.

The new organization will be known as the St. Louis Chauffeurs' Union, and will be affiliated with the Central Trades and Labor Union, of which Owen Miller is president. The initial meeting will probably be held within a short time. The chauffeurs will have in connection with their organization a board of examiners, whose duties will be to examine all chauffeurs and applicants and determine whether they are competent to operate a car.

The taxicab chauffeurs also want wind shields, similar to those on street cars, placed on their cars, but have not decided whether they will advocate a city ordinance making the shields compulsory or make an appeal to employers.

#### Gilbert Manufacturing Company Increase Capital.

The Gilbert Manufacturing Company, of New Haven, Conn., filed notice of an increase in capital stock to the amount of \$50,000. The company recently took over the F. E. Bowers Company, of New Haven, and in the future will manufacture and market the well known Bowers carburetors. The Gilbert Manufacturing Company claim to be the oldest established company in the manufacture of motor car accessories, and to have put on the market the first tire case and tire bracket for carrying spare tires on automobiles.

#### A. M. C. M. C. 1010 Handbook Out.

The handbook of the American Motor Car Manufacturers' Association, giving the specifications of cars made by members of the association for 1010, has just been issued from the press. It contains the names and specifications of products of the six makers which recently joined the A. L. A. M., thus emphasizing the fact that these firms have not withdrawn from the A. M. C. M. A. In fact, officials of these firms hold several of the highest positions in the association. The list of members contains forty-three names.

#### Change in Personnel of Whitlock Coil Pipe Company.

Arthur S. Hyde, president and general manager of the Whitlock Coil Pipe Company of Hartford, Conn., has resigned. James L. Goodwin, the treasurer of the company, will hereafter also act as manager, and Eugene R. Mertens will be superintendent of the plant. C. E. Beach and John B. Murphy have been elected president and vice president, respectively.

#### General Motors Company Gets Detroit Track Concession.

The General Motors Company, who recently bought a large tract of ground on Morrow street, Detroit, on which they plan to erect a large parts factory, were drawn into a dispute with other manufacturers on the same street regarding a concession from the city council for laying a spur track in the street from the company's site to the Michigan Central Railroad. The other manufacturers held that if the General Motors Company were to have the exclusive use of the track in the street they should be required to bear the entire cost of paving the street outside the tracks, but the protestants were willing to bear a certain amount of this expense if they were allowed to run spurs from this track to their factories. An agreement is said to have been finally reached whereby the General Motors Company pays one-third of the \$17,-000 required for paving the street.

#### Next Year's Prince Henry Tour.

The program for the Prince Henry tour for 1910 has been definitely arranged by the German Imperial A. C. and its associated clubs. One of the changes in the rules over this year is that the three point handicap on professional drivers has been abolished. The cars will be officially accepted in Berlin on June 1, and the itinerary will be as follows: June 2, Berlin-Brunswick; June 3, Brunswick-Cassel; June 4. Cassel-Rothenburg; June 5, day of rest at Rothenburg; June 6, Rothenburg-Strassburg; June 7, Strassburg-Coblentz; June 8, Coblentz-Hamburg. There will be two speed trials, the first during the Berlin-Brunswick stage on June 2, and the second during the Coblentz-Hamburg stage on June 8. The latter will be held over a portion of the Taunus circuit between Limburg and Weilburg. Entries at single fees (400 marks) close on April 1, and at double fees on May 1. Strict regulations prevail as to the body shapes and equipment.

#### Stock Car Race Proposal Disregarded by Recognized Clubs.

At the conference of recognized automobile clubs held in Paris on December 7 it was decided that short distance records will in future be valid only if the cars are timed with automatic electric timing devices. The recognized national clubs will buy an electric timing apparatus which they will rent to local organizations under whose auspices record trials may be held. The proposal of the A. C. A. to limit next year's international trials to stock car chasses was rejected, for the reason that it was not received in time for consideration. Each of the clubs is to make a proposal for in international triptyque system by February t. and to use its influence with its own Government for the adoption of such a system which would enable tourists to pass from one country into another without being hampered by customs requirements.

### COMMENTS AND QUERIES OF READERS.

#### Valve Timing Data.

Editor Horseless Age:

In conventional practice what is the earliest and what is the latest point one finds for the opening of the admission valve of a four cycle gasoline motor? I presume that this point is most early in the highest speed motors. Is this always the case? What limits the position at which admission occurs?

Also, can you give me any information as to the effect on the speed and torque characteristics of such a motor when the point of closing the admission valve is varied?

At what time does the exhaust occur and cease, and what is the effect of varying these events in the same way as above?

N. S. SEELEY.

[In our issue for May 20, 1908, we published valve timing data for thirty French motors. The inlet valve opening lag varied from zero to 34 degrees, the average being 121/2 degrees. The normal speeds of these motors varied between 1,000 and 1,700 r. p. m, and it seems that the greater inlet valve opening lag corresponds with the higher speeds of revolution, though, as might be expected, the relationship between the two factors is very indistinct. Thus, for instance, two motors with normal speeds of 1,500 r. p. m. each have absolutely no inlet valve opening lag, while two with normal speeds of 1,300 r. p. m. each have inlet valve opening lags of 20 degrees.

If the inlet valve opens too late the amount of charge admitted will be reduced, for though the suction will then be greater the rate of flow will not be proportionately greater.

The effect of changes in the admission valve closing was thoroughly discussed and illustrated with the aid of numerous diagrams in The Horseless Age of June 30, 1909. The experiments there described were made with a 100x140 mm. motor, with the connecting rod twice the length of the stroke. The inlet valve opened when the piston was 3 mm, on the down stroke. The exhaust valve began to open 8 mm. before the end of the downward stroke and closed at the end of the next upward stroke. It was found that at speeds between 1,000 and 1,500 r. p. m. a lag of 30 mm. in the inlet valve closing gave the best torque, power and fuel economy. It is obvious that this lag is disadvantageous at slow speeds, as with the smaller gas inertia some of the charge is forced out again during the portion of the compression stroke that the inlet valve remains open. The lag of 30 mm. in the above case is equal to an angular lag of 72 degrees. In none of the thirty French motors for which we published data did the inlet valve close as late as this. The inlet valve closing lag varied between

zero and 58 degrees, and the average was about 26 degrees.

The lead of the exhaust valve opening in these same motors varied between 30 and 58 degrees, and the average was 46 degrees. The lag of the exhaust valve closing varied between zero and 20 degrees; it was zero in most cases and the average value was 5 degrees. We have no data concerning any systematic investigations of the effect of varying the time of exhaust valve opening and closing aside from those given by P. S. Tice in THE HORSELESS AGE of October 2, 1907. It is impossible to briefly summarize these experiments, as all of the points determining the valve timing were varied, but the results indicate in a general way that the maximum power of the motor increases as the exhaust valve opening lead is increased to about 45 degrees, and that an exhaust valve closing lag of 10 to 12 degrees gives more power than no lag in the time of closing this valve.—ED.]

#### Easy Starting in Cold Weather.

Editor Horseless Age:

It is hardly necessary to state here that with the present density of commercial gasoline the starting of a very cold motor of large bore is a task to make "strong men weep" and use language "unfit to print."

All this energy can be conserved and the temper of the cranker kept normal by priming the cylinders or the air intake of the carburetor with a mixture of one-half gasoline and one-half crude sulphuric ether. Use a long nosed one-half pint oil can, and carry it on the car with you. Then, no matter how cold the night, or how long the poor car has stood out in the zero air, while you were inside absorbing palate polish or looking into liquid eyes, your pleasure will not be marred by the prospect of having to turn the motor over a few million times, during which you get into a perspiration and afterward catch a heavy cold. It is a veritable Pazaza for the disease of nonstartitis. E. T. BIRDSALL.

#### Stopping Distances.

Editor Horseless Age:

I am anxious to know something about the number of feet within which an automobile can be stopped by the use of brakes, etc., in case of an emergency. Can you advise me whether or not any test along this line has been made, and if so, give the general results? I would like to know substantially within how many feet an automobile weighing from 2,500 to 3,000 pounds can be stopped in case of an emergency, on a good, level, macadam State road, when going 35, 30, 25, 20 and 15 miles per hour. Of course, I assume the driver throws the

clutch out and applies all the brakes, and does whatever is necessary to stop his machine in the shortest space. Can you give me any information or inform me where I can find out?

[Brake trials to determine the minimum distance in which an automobile can be brought to a stop by the use of the brakes, from various speeds, were held under the auspices of the Automobile Club of America on Riverside Drive, New York city, a May 1, 1902. The results show that the distance in which the car can be brought to a stop varies substantially as the square of the speed. From a speed of 10 miles per hour the car can be stopped in 15 feet; from 15 miles per hour in 34 feet; from 20 miles per hour in 60 feet; from 25 miles per hour in 94 feet; from 30 miles per hour in 136 feet, and from 35 miles per hour in 184 feet. These figures are averages. A full report of these trials appeared in Tax Horseless Age of May 7, 1902. Trials held with different types of horse vehicles at the same time showed that they required a greater distance than the automobiles to come to a stop from a given speed.

Similar trials were held in Philadelphia in June, 1902 (reported in THE HORSELESS AGE of July 2, 1902), and in Welbeck, England, on January 11, 1902 (reported in THE HORSELESS AGE of January 20, 1902). The committee of the Automobile Club of Great Britain and Ireland which conducted the latter trials derived the following conclusions from the results of the trials: Considering the average length of vehicles to be 11 feet 8 inches, cars can be brought to a stop:

From 11 to 14 miles per hour in 1 4-5 times the vehicle's length.

From 15 to 17 miles per hour in twice the vehicle's length.

From 18 to 20 miles per hour in 234 times the vehicle's length,

From 20 to 25 miles per hour in 3½ times the vehicle's length.

The A. C. of Great Britain and Ireland did not give out the actual results of each separate test, but simply the conclusions drawn from these results.—ED.]

### Formula for Combined Torsional and Bending Stresses.

Editor Horseless Age:

Will you, through the columns of your valuable paper, explain the method of calculating combined stress in a shaft subjected to torsion and bending, as well as mention a text book that treats the subject clearly?

S. C. H.

[The following formula is taken from Mansfield Merriman's "Mechanics of Materials," published by John Wiley & Sons, New York, which may be recommended as a clear and concise treatise on the design

of beams, columns, shafts and similar simple structures:

$$a^{6} = \frac{16 \text{ M}}{\pi t} + \frac{16}{t} \sqrt{\frac{M^{3}}{\pi^{2}} + \frac{402,500,000 \text{ H}^{2}}{n^{2}}},$$

where d is the diameter of the shaft in inches, M the maximum bending moment of the transverse forces in pounds-inches, H the number of transmitted horse power, s the number of revolutions per minute, and t the safe working stress (tensile or compressive) of the material.—Ed.]

#### Assembled Cars.

Editor Horseless Age:

I was much interested in the article by E. J. Bartlett on "Building a Car from Standard Parts," and can heartily indorse all that he says. One point that he mentions cannot be too strongly impressed on parties new to the automobile business, who contemplate building a car of this kind, and that is the fallacy of supposing that it is a simple and easy task to make a good car from stock parts.

It is true that any amateur can put together a near-car that may seem to be good, but to make a car for the market that will stand up and meet the criticism of the motoring public and not be a mark for the knocks of competitors is quite another matter. Only an engineer of experience with a full knowledge of the requirements and the qualities and adaptability of the available material will make a success of this type of car.

A point that Mr. Bartlett did not mention is that some concerns after having the first car designed by a competent man do not think it necessary to continue his services, with the result that changes are made in the subsequent models that either increase the cost, delay deliveries or spoil the car, or all three.

Every carriage builder who contemplates going into the automobile business should memorize Mr. Bartlett's article, and also remember that brains as well as wood and steel are necessary in a car.

EDWARD T. BIRDSALL, M. E.

# Mr. Cooper's Adjustable Wrist Pin Bearing.

Editor Horseless Age:

Referring to the contribution by W. F. Cooper on "Adjustable Piston Pin and Valve Plunger Design," in your issue of December 8, in Fig. 1 is sihown a cross section of a cylinder, piston, connecting rod and a suggested piston pin. Will you please explain how the pin is assembled with the connecting rod and piston? The only solution I have been able to reach is that the upper connecting rod bearing is capped, instead of being solid, as would be inferred from the drawing. If this is the case, however, there would seem no need for the rather elaborate means offered for adjust-

ment, as the bearing could be adjusted in the same manner as other split bearings.

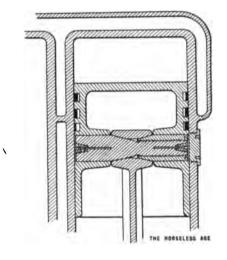
E. F. WARREN.

[We submitted the above letter to Mr. Cooper, who replied as follows:

Editor Horseless Age:

Answering your correspondent's request for information on my method of assembling the adjustable piston pin design, as shown in the December 8 issue of The Horseless Age, would say that the rod was originally put up with a capped bearing. The drawing from which the sketch was made showed this construction, but was improperly sectioned in this view. It was my intention to change this drawing so that the non-adjustable end of the piston pin would be the same diameter as the adjustable cone, enabling the solid connecting rod to be assembled.

With regard to the elaborate adjusting means which your correspondent objects to, would say that on two occasions this has made it possible to adjust a worn piston



pin in not over three or four minutes, and to save tearing down the engine to get at the capped connecting rod.

I venture to say that there are very few mechanics who can tear down and replace a cylinder inside of twenty-four hours, and in the majority of cases it would be a matter of one or two weeks. I believe you will find the average garage would charge at least \$75 or \$100. For this reason I believe the added complication is justified.

Would add that the sketch Fig. 2 should have shown the part 4 as provided with a square thread for the nut 5 to work upon, to prevent excessive adjusting of the upper portion of the bearing. W. F. COOPER.

[Mr. Cooper's estimate of the cost of adjusting or rebushing the ordinary connecting rod upper end bearing is exaggerated. While his scheme, as shown corrected in the cut herewith, is perfectly feasible, we would much prefer the money which it would cost put into an ordinary simple wrist pin of good material and liberal sized bushings also of good material, which, if reliable oil-

ing means are provided, should outlast four or five sets of crank pin and main crank bearings, owing to the very limited and slow motion at the wrist pin bearing surface.

We have had about a dozen other letters calling attention to the fact that as shown the parts could not be assembled. We thank the writers for calling attention to the oversight, but print only the first letter received.—Ep.]

### Horse Power Rating for Taxation Purposes.

Editor Horseless Age:

The new law of registration of automobiles in Massachusetts makes our Ford runabout 22½ horse power. The maker's rating is 15 to 18.

Do you think the A. L. A. M. rating to be nearer than the makers? The A. L. A. M. do not take any account of the stroke, so it makes our engine as much as this year's touring car, which has a five-eighths of an inch longer stroke. I suppose we will have to pay according to their rating, but would like your opinion.

IRVING H. SMITH.

[For purposes of taxation it is necessary to adopt some definite rule based upon easily ascertainable dimensions, and the A. L. A. M. formula meets this requirement. If the authorities went by the manufacturer's rating we would no doubt soon have all sorts of fanciful ratings. The A. L. A. M. formula is intended to give the horse power obtainable from a motor of given cylinder dimensions, built in accordance with the best modern practice, at 1,000 feet piston speed per minute. It undoubtedly gives very close results for these conditions. But some manufacturers choose to rate their engines for lower piston speeds, which naturally gives a smaller rating.—ED.]

#### Causes of Magneto Failure.

Editor Horseless Age:

It will no doubt be of considerable interest to know that for the 1910 season every Napier car will be supplied with a magneto, and in the case of the large six cylinder models magneto and synchronized ignition will be supplied.

During the last four years sixty-three different types of magnetos have been carefully tested. During 1908 thirty magnetos were tested, and of these only four passed the tests reasonably satisfactorily. The method of testing was as follows:

They are first placed on a bench and run by means of a belt at speeds corresponding to the maximum speed they would be required to run at on the engines; that is to say, in the case of the two and four cylinder models they are tested up to the equivalent of 2,000 engine revolutions per minute, and on the six cylinder models up to the equivalent of 3,000 engine revolutions per minute.

Now, just to deal with the tests of last year's magnetos, the following schedule shows clearly the causes of why the magnetos failed:

You will understand that some of the magnetos tested developed several of the faults in one individual magneto, while others only had one single fault.

S. F. EDGE.

### Books on Assembling and Racing. Editor Horseless Age:

Will you kindly give me through the columns of your paper the name of some book dealing with the assembling and dissembling of an automobile; also one on the subject of racing cars, their peculiarities of construction, method of handling, etc.? Thanking you in advance for any information you may be able to give me, I am, M. B.

[We know of no book on assembling an automobile, except the general works on automobile construction, and there are none very comprehensive and up to date in that line. Not much can be said on the matter of assembling in a general way, the work depending so much on the construction of the particular car. As regards racing, the Royal Automobile Club of Great Britain and Ireland is publishing a book entitled "A Record of Motor Racing," which will contain a chapter on constructional details of racing cars. So far very little has been published along this line, as manufacturers always preserve an air of secrecy about their racing machines, but since a number of members of the Royal A. C. are private owners of racing cars it may be possible to get together a good deal of interesting matter under this head.—ED.]

### Unbelievable Economy. Editor Horseless Age:

I am an interested reader of The Horse-Less Age, so for the good of the trade in general I enclose a clipping which I wish you would publish and comment on in your next issue. This is only one of many such statements that are seen from time to time in the space devoted to automobiles. I think it time that such statements be thrown in the waste basket instead of being published for the sake of information to people who know better.

Assuming a high average of 15 miles to the gallon, and a low cost of 10 cents per gallon for the gasoline, and the figures are proved to be impossible.

I know the roads around Renovo, Pa., and am sure that there is not a tire made that will do half that distance without coming to grief, as there is not a good road out of Renovo in any way you wish to travel, except the little brick paving in the borough and perhaps a mile or so east and west. What roads there are are covered with either sand or silica rocks, so how could a tire last half of 36,000 miles—over six times the guarantee on any tire? Furthermore, I would like to lay a wager that there is not an auto there that has run 36,000 miles in fourteen months.

A. D. E.

[The clipping referred to, which is said to be from the Philadelphia *Press* of December 19, reads as follows:

"Charles L. Fullmer, of Renovo, Pa., has written the Penn Motor Car Company telling of the remarkable economy of his ——car, which he ran for fourteen months, covering 36,000 miles, at a total cost of \$134.35, including oil, grease, gasoline and tires. He says that the tires are in excellent shape still."

We have omitted the name of the car, as it is immaterial and the manufacturer obviously had nothing to do with the insertion of the item.

We would not be too severe with Mr. Fullmer, for the reason that it is quite possible that either his stenographer or the compositor made a mistake in the number of noughts, and instead of 36,000 he may have meant either 3,600 or 360. But if he sticks to the 36,000 miles he is certainly a fit member for the Ananias Club—barring the possibility that he steals his auto supplies or does not pay his bills.

—ED.]

### Taxicab Opening in Wilkes-Barre. Editor Horseless Age:

Referring to the article by John B. Mooney, regarding taxicabs in Wilkes-Barre, the writer read this article over very carefully, and must say that Mr. Monney has sized up the situation about right, and without a doubt there is a good opening for a taxicab serivce in Wilkes-Barre, if it is run the same as in other cities. The writer has not the time to devote to this business, but would be only too glad to go over the matter with anyone, and would be willing to assist in getting a good taxicab service started in Wilkes-Barre.

C. L. Davis,

Manager Wyoming Valley Motor Car Company.

### Calculation of Compression Space. Editor Horseless Age:

Why do the different formulæ for figuring the necessary compression space give such different results? I wish you would solve the following problem: A compression pressure of 60 pounds gauge to the square inch is wanted; the engine has a bore of 41/2 inches and a stroke of 41/2 inches; how many cubic inches of compression space is needed?

C. S. H. WESTENBERG.

[The reason that different formulæ give different results is that the compression depends upon the degree of filling of the cylinder at the moment compression begins, which varies with the sizes of the valves and passages, and with the speed of the motor. The compression is not nearly as high at high speeds as at moderate speeds. If we assume that the cylinders are filled to a pressure of 12 pounds per square inch absolute at the moment compression begins, then the compression space necessary to give a compression of 60 pounds gauge in 436x4½ inch motor would be about 27½ cubic inches.—ED.]

#### Electric Vulcanizers.

In connection with the article entitled "How Covers and Tubes Are Vulcanized" in our issue of December 8, C. A. Shaler Company, of Waupun, Wis., call our attention to the fact that electric vulcanizers can be exactly regulated as to temperature, and the vulcanizing temperature be maintained as long as desired, inasmuch as the flow of electricity can be controlled absolutely. This, of course, is impossible with gas, gasoline or alcohol. Owing to the fact that there is no flame the vulcanizer may be used in any position, even bottom side up, so that every part of the tire can be reached while it is still on the wheel; or the vulcanizer can be used flat, which is the natural and easiest position when working on an inner tube.

Every Shaler electric vulcanizer is supplied with an accurately tested thermometer, and also with a shelf on which to vulcanize inner tubes, a flat face for this work, a concave face for vulcanizing casing, a chain and bolts for clamping the vulcanizer to a casing on the wheel, a full set of directions and enough Para rubber and vulcanizing cement to make the first few repairs. The vulcanizer, moreover, has a handle so that it can be easily moved from job to job without waiting to cool it off. It is claimed that 30,000 motorists are using this vulcanizer at present, and that it is in use in about 75 per cent. of the garages of the country.

#### To Build Corliss Cars.

The Corliss Mortor Company has been incorporated at Corliss, Racine County, Wis., with a capital stock of \$1,000,000. The company will build and market a six cylinder automobile, the feature of which is that it weighs 1,000 pounds less than any six on the market. The car will cost \$3,000. It is believed that the Wisconsin Engine Company, of Corliss, which is owned by Eastern steel mill men, is backing the new company All steel used in the car will come direct from the Pennsylvania mills owned and controlled by them. No wood will enter into the construction of the car.

It was reported some time ago that the owners of the Wisconsin Engine Company had purchased the Owen-Thomas Moter Car Company, of Janesville, Wis., and it is believed that the new company is organized with the object of continuing the Janesville concern. The Owen Thomas is a six cylinder car with many novel features.

# Are Mathematical Articles Appreciated?

Editor Horseless Age:

Have just read your editorial on mathematical articles, and hasten to place myself on record as an advocate for the use of mathematics in the treatment of all technical subjects, as far as possible, by all means. I cannot conceive of any logical method of treating the problems of design that come up for publication and discussion other than by mathematics, nor can I see why anyone not versed in mathematical language need care to enter into these matters. Nor can I see how, if anyone is interested in technical problems, he can expect to get very deep until he can handle the mathematics.

I feel that the present discussion will not be allowed to be one sided, as I should indeed regret to lose the accurate and concise mathematical paper for the more flowery, wordy, "leading-nowhere" sort of article that attempts to handle these purely engineering matters without mathematics. I feel that I have as much right to say, "Why crowd the paper full of comments and queries of the novice, etc.?" because they do not interest me.

The policy of your paper in the past has been satisfactory to me. I can only wish you may stir up enough discussion on both sides of this question to induce you to make technical subjects as technical as they can be made, the dilations on "how to run a motor car" just as amateurish as they can be made, and I believe each will be satisfied with the results. I can only suggest that inasmuch as some of the many points discussed by the so called "high brows" may be interesting to a certain class of readers, an editorial take care of this, as has been done before in other papers as well as in The Horseless Age.

Trusting that you will give my words some consideration, and that you get enough letters of like nature to prevent you taking a step that would cause your paper to be less valuable to me.

H. H. KENNEDY.

Editor Horseless Age:

Your editorial on "Mathematical Articles" is read with interest, and as you desire an expression from your readers relative to their desirability, I beg to write the impression of this reader. Although at present I am not connected with the manufacture of automobiles, I have been, and, as an engincer and user, am still interested in their mechanical development. A few years ago, when designing and manufacturing, I turned in vain to technical literature for assistance, and I am still impressed with the fact that there is comparatively little published that is really a scientific treatment of the physics and mechanics of automobile design. The older commercial mechanisms are very thoroughly covered in their respective technical journals, and are continually discussed in a highly scientific manner. THE HORSELESS AGE is the only paper I have seen that attempts to perform this function for the automobile, and I believe it would be a loss to its mechanical development should you discontinue the one feature which has made your paper so valuable to scientifically trained men.

The industry started in this country by largely copying the foreign types of machines, and the early gas engine driven cars showed the results of a combination of the wagon maker's knowledge with that of the skillful, but untrained, mechanic, and the untrained mechanic was in evidence for some time. Of late years cars are showing more and more the results of study by the scientifically trained engineer, and it is this class of workers—the trained engineer—you assist by affording means of communication for the methods and results of their research. I think those of your readers who are not directly interested in the necessarily mathematical treatment of such subjects will gladly allow the space when they realize that ultimately they will be directly benefited by the continued mechanical improvement which the publishing of such scientific discussion makes possible—they will have better cars to sell or to use, as their case may be.

The sporting and trade fields of motoring are well covered in all the journals. I, for one at least, hope THE HORSELESS AGE will continue to give technical, and especially scientifically technical, information.

W. GRANT KING.

Editor Horseless Age:

I have read your editorial on "Mathematical Articles" with interest, and would say that I for one appreciate the technical articles which appear from time to time, and desire by all means to see them continued. I am a draughtsman employed in the automobile industry, and my main reason for subscribing to THE HORSELESS AGE was because it was the only American automobile paper which published to any extent technical articles. THE HORSELESS AGE has a name among those directly interested in the design and manufacture of automobiles as being the best technical automobile paper, and has more subscribers among them than any other paper.

Articles bearing on the design of various parts of the car, such as crank shafts, connecting rods, front axles, etc., which you have published have been very helpful to me. There are no books at present which treat on these subjects, and where shall we get this information if not through trade papers? Foreign papers publish technical articles, one paper, La Technique Automobile, being entirely technical. Why should not some American automobile papers publish them?

I think you should publish at least one

technical article a week. I do not think this would be a greater proportion to the rest of the reading matter in that number than the proportion of those interested in these articles is to those who are not.

HERBERT G. SNOW.

Editor Horseless Age:

In reference to mathematical articles in your paper, I would state that they are of great value to the automobile designer. Almost every designer has some technical hand books, but there is no comprehensive collection of technical data on automobile design. It is advantageous for the designer to secure the data collected by different writers for different purposes, and if the non-technical reader doesn't get any benefit out of these mathematical articles he will get it with his car.

JOSEPH ZAGORA.

Editor Horseless Age:

I note in the issue of December 8 an editorial on "Mathematical Articles." I sincerely hope that you will not discontinue such articles, as with the scarcity of really good books on automobile design, as brought out in your answer to "C. B.," in the same issue, it is often very hard, if not impossible, to get mathematical formulæ which are up to date and reliable, except from such articles, and it was on account of them largely that I first subscribed to your paper, and have kept up my subscription.

W. F. Davidson.

Editor Horseless Age:

Referring to your editorial as to the value of mathematical articles, I can only say that if they were eliminated I would hardly feel like paying my subscription each year, as I can get all the other news without cost. I believe it is a mistake to assume that only engineers and men in the factories read such articles, as I personally know of at least ten owners who are not in any way connected with the trade who take your paper solely on account of the excellence and reliability of its technical articles. The abandonment of this department would probably result in the starting of a new technical paper.

E. T. BIRDSALL, M. E.

Editor Horseless Age:

In regard to your editorial of December 8 on mathematical matter, please note that the reason I have subscribed for The Horseless Age is because of that very article on "Springs," otherwise I would not take the paper. I am a draughtsman in the auto line, and the road and race events are of no interest to me, but when I have taken time to read and study a mathematical article I have not time to sit down and write a letter "knocking" on road arti-

cles. I believe this is why you do not hear from our side of the question. As to putting things into more popular forms than mathematical formul=, if that were possible, as some assert, then the "royal road to learning" would be a question only of time and money, and not of brains and study. If people have not patience to read the deeper articles, let them keep still and let those who will continue to study. Please put in more of such articles as "Calculations of Chassis Springs."

J. F. COYLE.

#### Editor Horseless Age:

Regarding your recent editorial comment on the contrary attitude of readers toward the publication of articles treating of automobile topics mathematically, would say that the publication of these articles, to my mind, constitutes the most valuable feature of your journal. In fact, it was somewhat of a disappointment to me when going over The Horseless Age for 1909 in failing to find a single mathematical article in any of the issues save that on the "Calculation of Chassis Springs."

Why should such a paper as THE HORSE-LESS AGE be outdone by the foreign periodicals, which are filled with technical matter, mostly in mathematical form?

No doubt the multitude of engineers who look upon THE HORSELESS AGE as an up to date authority on automobile topics, and keep same on file for reference, will be unanimous in their protest against the discontinuance of mathematical articles, and would certainly make the editor's ears burn with their adverse comment.

To repeat: by all means keep up the publication of mathematical articles, and let's have at least one in each issue.

ERNEST M. KLUCK.

#### Editor Horseless Age:

I have read your editorial on "Mathematical Articles." Being a subscriber, I take the liberty of writing this letter to you. In the first place, I have subscribed to The Horseless Age because of the mathematical articles published in it. I therefore hope that you will not omit the mathematical articles.

An engineer without a knowledge of mathematics is just like an electrician without tools. Therefore, if you will omit the mathematical articles I feel sure that the engineers will drop their subscription to The Horseless Age as soon as they know of any other magazine that publishes mathematical articles.

SAMUEL HYAM GLUCROFT.

#### Editor Horseless Age:

Having just read your editorial on "Mathematical Articles," I take the liberty of suggesting the attitude of no inconsiderable per cent. of your readers whose position may be similar to my own. An an enthusiastic student of the automobile, I am only too glad to find some article, for example, "Calculation of Chassis Springs," which though in part beyond my depths

is nevertheless a stimulus to the acquirement of a more thorough and technical knowledge than may possibly be gained from the average book or magazine. I believe that anyone who wants to know automobiles at all well wants more than vague generalizations, and the lack of exact specifications and dimensions renders an otherwise interesting article exasperatingly useless. Yours is the only motor publication I know of that is never lacking in this respect.

MARCK BANDLEY.

#### Editor Horseless Age:

Referring to your editorial on "Mathematical Articles," I wish to enter a word of protest against dropping that part of your magazine which gives it prestige and weight. I have frequently heard non-technical men back their arguments for or against some particular motor car construction by quoting THE Horseless Age and the formulæ and deductions from these same mathematical articles. The writer is of the opinion that your mathematical articles are read and enjoyed by a much larger circle than you think. Certain it is that if the articles in question are not a part of what the writer now thinks to be the best all round motor car journal in America, it will fall to the level of \* \* \*. We trust you will continue the articles.

L. P. GILBERT.

#### Editor Horseless Age:

Your editorial on "Mathematical Articles" noted, and would say that to discontinue publishing these articles would detract from the value of your paper. While there are, no doubt, many to whom these articles are of no apparent value, they are greatly appreciated by men in the engineering end of automobile construction. The Horseless Age is the one paper of value to this class of subscribers.

F. W. Slack.

#### Editor Horseless Age:

I wish to inform you that I appreciate very much the mathematical articles in The Horseless Age. I was for years a subscriber to different German and French automobile papers, and they always contained more mathematical articles than The Horseless Age. I would regret it very much if you were to cut out these articles entirely.

C. S. H. Westenberg.

#### Editor Horseless Age:

I have just read your editorial concerning "Mathematical Articles." I think it would be very unwise for you to discontinue them. Why? Well, my reasons for wishing them continued seem to coincide, exactly with yours.

Fred W. Kiser.

#### Editor Horseless Age:

In accordance with the suggestion in the editorial in your last issue, I hasten to express my keen appreciation of the technical and mathematical articles which appear all too infrequently in your valuable paper.

Should you discontinue these articles it would destroy the usefulness of your publication for a large body of subscribers—draughtsmen, engineers and designers—who are entirely dependent on you for such information, since yours is the only automobile paper in the English language which publishes technical articles which are worthy of the name. I sincerely hope the responses to your editorial will be sufficiently numerous to warrant you not only to continue the articles, but to increase their number, so that we may have some article of a technical character in every issue.

GEO. W. HARPER.

#### Editor Horseless Age:

Permit me to express my appreciation of the so-called mathematical articles appearing at times in your paper. I hope and believe that a sufficient number of engineers and designers will write you regarding the value of the articles to them to induce you to continue them.

I wish to ask in regard to assembling of adjustable piston pin, described by Mr. Cooper: Is it meant for a "pigs in clover" puzzle or is the piston split somewhere and then bolted together?

E. W. WEAVER

#### Revere Rubber Company Passes Into Control of United States

Rubber Company. The United States Rubber Company, known as the "Rubber Trust," has secured control of the Revere Rubber Company, in whose works the Continental tires are manufactured. The price paid for the stock is said to have been \$200 per share, at which rate the consideration for the whole issue would have amounted to \$4,000,000. It is expected that the Revere Rubber Company will be merged with the Rubber Goods Company, and that it will operate one of the at present idle factories of the United State Rubber Company, to enable it to increase its output of tires and mechanical rubber goods. The Revere Company has outgrown its present plant, but further enlargements are impossible owing to its location.

#### Fiat Changes for 1910.

There are relatively few changes in the well known Fiat cars for the coming season. Instead of the automatic control, the magneto advance is now direct from the wheel sector. A change has been made on the valve lift guides, which are entirely of steel this season instead of bronze. The lubrication system, which is of the force feed type, while essentially the same as in 1909, has been improved in efficiency by a few minor touches. The only other change noticeable is in the chain drive models, which have completely enclosed chain cases, which are absolutely dustproof and sandproof, thereby insuring better lubrication. A commendable feature, which is continued in all new models, is that the tire sizes for all four wheels of the car are the same.

### THE FIELD OF COMMERCIAL APPLICATIONS.

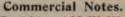
#### remier Motor Ambulance.

otor ambulance, with a body similar mousine in appearance, has recently aced in service by the A. M. Ragsompany, an Indianapolis undertaking a, and was first used in connection he hospital service at the recent Incilis Speedway races. The chassis is ular Premier four cylinder model, he construction of the ambulance, easy riding qualities and a desire to

#### Pay-as-You-Enter Motor Bus.

The accompanying illustration shows a twenty passenger "pay-as-you-enter" bus, recently delivered by the Knox Automobile Company, of Springfield, Mass., for service upon the Orange street line in New Haven, Conn., where the authorities have declined to grant a trolley franchise. Entrance to the vehicle is through a hinged door, close to the front end and within reach of the motorman, who opens and shuts it by means of

the chassis here used. Instead of the four cylinder, 40 horse power, air cooled engine there stated to be used, the 40 horse power water cooled R engine, described on page 180, Vol. 24, is the one employed in connection with the Knox three speed and reverse selective gear set, which has been designed for specially arduous commercial service.



W. M. Goodrich and M. W. Wagener will shortly establish a taxicab service in Kansas City, Mo., with a number of Croxton-Keeton taxicabs.

The White Oak Coal Company, of Washington, D. C., have placed an order for eight-Studebaker electric trucks of 3 and 5 tons capacity, with which they will deliver their coal.

Ten motor cars are being used out of Prinville, Ore., for stage purposes, where two years ago horse propelled vehicles were used entirely. J. H. Wenandy, of Bend, Ore., has put five autos into stage service between Bend and Shaniko by way of Madras. The Cornett stage line, which has been operated into the interior of Oregon, has put on three new machines, which are kept busy all the time.



PREMIER AMBULANCE.

the attention of the morbidly curious the chief desiderata. A double floor ally eliminates all sound from the nery while the patient is in the car. is an entrance on each side of the car of the driver's seat, and half of the fi the car opens, forming an entrance extretcher, which is of folding canvas. The canvas is mounted on a folder frame which folds and locks to hold lace. The stretcher is operated over

dace. The stretcher is operated over a concealed under the cushions of the eat and fits into steel grooves fastened front and rear of the interior of the The sides, back and front of the inare upholstered in black leather, are two folding chairs, one of which wed to make room for the stretcher, the other forms a seat for the physi-Half of the rear seat is also available the stretcher is in use. The double in the car also serves for storing the ner when not in use, or for storing tra chair not used when the stretcher lace.

body is finished in dark green, needle d with red. Each window is fitted curtains which bear the company's

When the ambulance is approaching atient's home or hospital, however, curtains are raised, thus removing all rance of an ambulance, and assuming if an elegantly appointed pleasure car. straps and also collects the fares, before the passengers enter the body of the car, so that no conductor is required.

The bus body is mounted upon a Knox standard 2 ton chassis, and it is stated that in future cars of this model the body will overhang slightly less at the rear and slight changes in the rear springing will be made.

A description of this 2 ton chassis will be found on page 751, Vol. 21, of THE HORSE-LESS AGE, which in the main applies to

#### First Indiana Motorcycle Factory.

Indiana will soon have its first plant for the manufacture of motorcycles in the Ko-komo Motorcycle Company, which has just been incorporated with an authorized capitalization of \$100,000. The company will establish a motorcycle plant at once, but the type of machine to be built has not been announced. Those interested in the company are W. H. Gilman, J. D. K. Kennedy, L. C. Woodfill, G. W. Charles and E. A. McGuire.



KNOX TWENTY PASSENGER "PAY-AS-YOU-ENTER" BUS.

### AUTOMOBILE LAW AND LEGAL EVENTS.

# Two Favorable Decisions in Damage Cases Against Motorists.

Where an automobile was being driven on a street from 4 to 6 miles an hour within the speed limit, and the driver did not discover that a horse, which was held by two men, was becoming frightened until after the automobile had passed it, and the horse did not become unmanageable until after the automobile had passed, and the driver did not observe that one of the men motioned for him to stop, but he stopped his automobile after he had passed the horse some 40 feet, and claimed that it would have frightened the horse more to have stopped when the horse first became frightened, it was held that he was not guilty of negligence. Baugher vs. Harman, 66 S. E., 86 (Va.).

The Supreme Court jury in the case of Benjamin Kraus against Dr. Floyd S. Winslow returned what is said to be the first verdict in favor of the defendant in a negligence suit against an automobilist in Monroe County, New York, recently. There was much conflicting testimony. A team which the plaintiff was driving in the East Henrietta road, Rochester, on May 9 was frightened by the defendant's automobile and ran away. Kraus was thrown out and seriously injured. Dr. Winslow's testimony was to the effect that the plaintiff was himself to blame for the accident, having blocked the roadway and refused to permit the defendant to pass. The only other eyewitnesses, besides Kraus himself, were a number of employees of the Ellwanger & Barry nurseries who were being conveyed by the plaintiff to the Ellwanger & Barry farm in Henrietta. Their testimony in effect corroborated the story of the plaintiff.

#### Matheson-Palmer & Singer Suit.

The suit of the Matheson Motor Car Company, of Wilkes-Barre, Pa., against the Palmer & Singer Manufacturing Company, came up for trial before Judge Archibald at Scranton on December 13. The contracts between the two companies were offered in evidence, giving the number and types of cars to be delivered, the number of tests to be made, the method of tests and other details. The Palmer & Singer Company allege that the tests were not made in accordance with the contract. The Matheson Motor Car Company allege that the Palmer & Singer Company defaulted in their contract in 1907 when the financial panic was at its height, and this left the Matheson Company with about half a million dollars' worth of cars on hand which had been manufactured to the order of the Palmer & Singer Manufacturing Company. The Palmer & Singer Company had \$25,000 on deposit with the Matheson Motor Car

Company as a guarantee of good faith, and had also made other payments, making a total of about \$42,000. This the Matheson Company declared forfeited, owing to the abrogation of the contract. The plaintiffs claim \$357,938.28, with interest from January 1, 1908, as damages sustained on account of the non-fulfilment of the contract.

#### Cut Price Dealers Enjoined.

The Circuit Court of the United States for the Southern District of New York has granted an injunction against a cut rate dealer handling the Klaxon warning signals, in the case of the Lovell-McConnell Manufacturing Company et al. vs. the E. J. Willis Company. From the papers on file in that case it seems that the Klaxon signals, which are covered by patents, are sold under a conditional license fixing the retail price of the large model, Type L, at \$35, and the smaller model, Type S, at \$30, with a maximum discount of 5 per cent. for actifal cash, and that certain cut rate houses have recently been selling for retail at a price considerably less than the license price.

The owners of the Klaxon patents decided to make an example, and instituted proceedings against the E. J. Willis Company, against whom United States Circuit Judge E. Henry Lacombe has just issued an injunction as asked for in the bill of complaint. It seems that the Federal law with respect to fixing the license retail price of patented articles is well settled and that the Klaxon people will have no difficulty in stopping every price cutter.

### Fined for Joy Riding in Employer's Car.

One of the first cases in Columbus, Ohio, where a chauffeur was fined for "joy riding" with his employer's car was tried in police court recently before Judge Osborn, and the man, C. G. Noland, was given a fine of \$25 and costs. Being unable to pay the fine and costs he was sentenced to the workhouse to work out the fine. Noland took the car of his employer, Dr. L. M. Early, head of the L. M. Early Automobile Company, and after a chase the police arrested him at 3 o'clock in the morning. His excuse was that he was testing the carburetor.

# Ohio Municipalities Cannot Regulate. Speed.

By an opinion rendered recently by Attorney General Denman of Ohio municipalities have no authority to enact ordinances to regulate the speed of motor cars within their limits. The decision was rendered upon the request of the city solicitor of Collinwood, which municipality sought to enact a speed law. It was held, however, that a

municipality has the right to determine to what zones the State law shall apply, or, in other words, to define what portions are classed as "closely built up and business sections," in which the legal rate of speed is 8 miles an hour. Many Ohio municipalities recently have sought to enact speed laws, with the result that all have been knocked out by the courts.

#### Manufacturers Sue Sales Agent.

The Victor Motor Car Company, San José, Cal., manufacturers of the Sunset automobile, have brought suit against Harrison P. Smith, of San José, to recover losses claimed to have been sustained through an alleged breach of contract on the part of Smith. The company entered into a contract with Smith early in 1907 whereby they were to turn over to him their entire output of 100 cars for that year, to be sold by him. After the contract had been in force for a short-time Smith refused to take any more cars, claiming that the company failed to keep their part of the agreement by delivering improperly constructed cars, and not furnishing them fast enough, whereby, he claims, he lost several sales. The Victor Company claim that Smith broke faith with them by refusing the cars, and they ask about \$1,500 dam-

#### Legal Notes.

The City Council of Terre Haute, Ind has declined to allow an appropriation of \$4,000 for the purchase of a motor fire engine. It is likely the question will be taken up again by the incoming administration, which will take office on January 3.

Under the new Michigan law, which goes into effect on January I, Canadian motorists wishing to drive in Michigan will have to register their cars in that State, the same as resident motorists, because the law grants exemption only to motorists residing in States which grant reciprocal privileges.

A bill has been introduced in the St. Louis City Council by Councilman Norvell to regulate street traffic in St. Louis. The bill was originally drawn by the St. Louis A. C. several months ago, and later indorsed by the St. Louis Automobile Manufacturers' and Dealers' Association. It is based on similar ordinances in force in Chicago and other cities.

Montague Roberts, the well known racing driver, was found guilty in the Criminal Court at Hartford, Conn., on December 15, of violation of the automobile law, and was sentenced to thirty days in jail and to pay a fine of \$150. The case grew out of an accident in Southington on September 17, in which E. L. Kieffer, of New Britain, was badly injured.

### New Records Made at Indianapolis Trials.

John Aitken, driving a National car, established new world's records for all distances from 1 to 20 miles in the Indianapolis Speedway trials on Friday, December The trials were made in a freezing wind, which was extremely hard on the drivers, and finally caused the racing to be discontinued. Aitken's record breaking dash occurred in the 20 mile time event, his time for the whole distance being 16:18.41. Walter Christie ran a quarter mile in 8.37. setting a new American record for the distance, which was immediately broken by Strang in the Fiat 200 horse power racer, whose best time for the distance was 8.05. Strang also made a new 5 mile world's record for oval tracks, viz., 3:17.70. Strang also established a new record for the Indianapolis Motor Speedway by driving I mile in 0:40.61. The previous record for the speedway was 0:43.6, established by Barney Oldfield last August. All records were established on Michelin tires.

Governor Thomas R. Marshal presided at the ceremonies incident to the rededication of the Speedway.

Following are the official times:

Ev	ENT N	0. 1.		
	1/4 M.	3/2 M.	ı Km.	1 M.
Fiat, Strang	11.60	21.96		46.18
	9.10	18.84		40.61
				No
	9.21	18.86		finish.
Christie	10.18	19.77		49.78
	9.02	19.17		46.22
	8.78	18.13	23.91	47.06
National No. 5,				
John Aitken	14.99	21.04	23.13	50.53
National six cyl-				
inder, John Aitken	9.81	21.08		46.00
Indian motorcycle,				
Fred Huyck-				
First trial	12.22	25.02		54.38
Second trial	12.85	25.51	• • • •	52.60
Motorcycle, John				
Link	14.26	29.28		1:4.28
Motorcycle, John				
Merz	14.88	30.01		54.56
Sr	EED TE	IALS.		
	1/4 M.	3/2 M.	ı Km.	ı M.
Christie-				
First trial	9.04	18.11		50.10
Second trial	8.92	18.23	24.50	42.58
Third trial	8.37	17.53	22.86	43.03
Fourth trial	8.70	18.08	23.45	43.77
Strang-Five mile to	Times	takan		

### Strang—Five mile trial intermediate. Times taken during trials—

		1/4 M.	1/2 M.	ı Km.	тM.	21/2 Ms	. 5 Ms.
No.	1	9.07	18.62	23.65			• • • •
No.	2	8.05	17.82	22.71	40.02		
No.	3	8.92	18.39	23.36	39.36	1:38.80	
No.	4	9.02	18.62	23.52	39.66	• • • •	3:17.70

No. 2 line is time taken while making flying start for 5 miles; No. 3, first lap; No. 4, second lap.

### A. A. A. Meetings During Palace Show.

The first meeting of the new A. A. A. executive committee will be held at the national headquarters, 437 Fifth avenue, Tuesday, January 11. The Good Roads Board of the association will hold a meeting January 5, to be presided over by Chairman George C. Diehl. A gathering of secretaries of State associations and clubs will take place Friday, January 14. Chairman Powell Evans, of the touring board, and Chairman Terry, of the legislative board will have board meetings during the show period. The directors of the New York State Automobile Association have decided to meet in New York City, Thursday, January 13. meetings will be at 437 Fifth avenue.

### Benz World's Speed Record Holder in This Country.

The Benz 200 horse power racing car which established new world's speed records at Brooklands, England, on November 8, as reported in The Horseless Age of November 10, was shipped to this country on the Majestic some time ago, and is now held by the Benz Import Company, of this city. It will undoubtedly compete in the next record trials to be held here. Several slight improvements have been made in the car since the Brooklands trials, and if a good, smooth track is found it is not unlikely that the Brooklands figures will be bettered.

### Another National Drivers' Organization Launched.

The automobile drivers and mechanics of Atlanta, Ga., have organized the National Association of Automobile Drivers and Mechanics, and have applied for a charter. The application for the charter is signed by E. W. Trippe, C. W. McDade, Thomas Lane, A. L. Barry and C. H. Welch. It is said to be the purpose of the members of the Atlanta Association to organize the drivers and mechanics in every large city in the United States, and to make Atlanta the national headquarters.

### Papers to Be Read at Engineers' Meeting.

The following papers will be read at the meeting of the Society of Automobile Engineers, to be held at the Automobile Club of America, on January 4: "A Classical Determination of Change Speed Gear Bearing Loads," by L. C. Freeman; "The Effect of Frequent and Heavy Charging Upon Pasted Lead Peroxide Plates," by Hugh Rodman. The following papers will be

read at the meeting in the Engineering Societies Building on January 13: "Characteristic Curves of Internal Combustion Motors," by B. D. Gray; "The Wider Dissemination of Professional Knowledge and Experience," by Henry Hess, member of the society; "Tests of a 20 Horse Power Franklin Air Cooled Motor," by L. R. Evans, M. E., Syracuse, N. Y., and R. T. Lay, M. E., Ithaca, N. Y. The annual dinner will be held at the A. C. A. on January 4 at 8 p. m.

#### Motor Sleigh Contest.

The A. C. of France offers a prize of 1,000 francs for a competition of motor propelled sleighs, which is to be held by the French Touring Club at Gerardmer in the Vosges Mountains on February 13, 1910, in connection with a week of winter sports at that place. The contest is open to two classes, viz., (1) sleighs with four cylinder motors up to 85 mm. (3.4 inch) bore, or motors with a different cylinder number of equal piston head area; and (2) sleighs with four cylinder motors of more than 85 mm. bore, or a different number of cylinders of equal piston head area. Each of these classes is to be divided again into subclasses, propelled by air propellers and by other means, respectively. The tests will consist of a hill climb over a course 3,000 feet in length, with a maximum gradient of 10 per cent.; a brake test and a speed test of 5 to 6 kms. In making the awards the judges will take into consideration the speed of the sleigh, the motor (adaptability for the special use, in respect to water circulation, lubrication, carburation, speed regulation, etc.), the method of drive, the method of braking and the method of steering. The arrangement of the body, its stability, the number of seats, the solidity of the runners and protection against cold and snow. For sleighs with air propellers a special prize of 500 francs is offered, and the Touring Club will award a gold medal. The entry fee is 50 francs per sleigh, and entries will be received up to February 5 by the contest committee of the Automobile Club of France, 8 Place de la Concorde, Paris.

#### De Dietrich Firm to Be Reorganized.

It is reported that the Société Lorraine des Anciens Etablissements de Dietrich & Cie. is to be reorganized, technically as well as financially. The original capital stock of 15,000,000 francs is first to be reduced to 7,500,000 francs, and new shares are then to be issued to bring the capital stock up to 15,000,000 francs again. The new shares will probably be placed by the banking firm of Nagelmackers & Fils. As regards the technical reorganization, it is stated that the Société Anonyme des Ateliers de Construction du Nord de la France and the Trust Metallurgique of Brussels and Paris will become interested in the firm. The Lorraine stock company was organized on March 1, 1905.

TWENTY MILES—ALL CLASSES.							
Firs Lag		Third Lap.	Fourth Lap.	Fifth Lap.	Sixth Lap.	Seventh Lap.	Eighth Lap.
National No. 5 2:2.0	2 4:06.56	6:09.68	8:12.10	10:15.20	12:17.01	14:18.60	16:18.41
National No. 4 2:01.8	8 4:04.73	6:07.22	8:10.60	10:12.28			
Cole 30 No. 9 2:40.5	3 5:20.51	8:01.28	10:41.35	13:22.48	16:02.44	18:41.87	21:22.11
Empire No. 10 3:16.1	2 6:28.14	9:36.32	12:45.22	16:04.05	19:13.27	22:23.85	25:50.43
Marmon No. 6 2:09.1	2 4:17.40	6:25.68	8:33.10	10:40.60	12:47.10	14:55.15	17:03.74
Marmon No. 7 2:12.9	7 4:25.88	6:37.95	8:50.83	11:05.61	13:21.20	15:37.40	17:52.88
Packard 30 No. 12 2:21.0	1 4:42.69	7:03.83	9:23.35	11:43.95	13:59.81	16:24.96	18:43.83

#### Exhibitors at the Chicago Show.

Coliseum-Main Floor. American Locomotive Co., New York.
Apperson Bros. Auto Co., Kokomo, Ind. Babcock Electric Carriage Co., Buffalo, N. Y. Baker Motor Vehicle Co., Cleveland, Ohio.
Bartholomew Co., Peoria, Ill.
Buick Motor Co., Flint, Mich. Cadillac Motor Car Co., Detroit, Mich. Chalmers-Detroit Motor Co., Detroit, Mich. Columbia Motor Car Co., Hartford, Conn. Corbin Motor Vehicle Corp., New Britain, Conn. Dayton Motor Car Co., Dayton, Ohio. Elmore Mfg. Co., Clyde, Ohio. Everitt-Metzger-Flanders Co., Detroit, Mich. Franklin, H. H., Mfg. Co., Syracuse, N. Y. Haynes Automobile Co., Kokomo, Ind. Hudson Motor Car Co., Detroit, Mich. Jeffery, T. B., & Co., Kenosha, Wis. Knox Automobile Co., Springfield, Mass.
Locomobile Co. of America, Bridgeport, Conn. Lozier Motor Co., New York. Maxwell-Briscoe Motor Co., Tarrytown, N. Y. Matheson Motor Car Co., Wilkes-Barre, Pa. Metzger Motor Car Co., Detroit, Mich. Midland Motor Co., Moline, Ill. Mitchell Motor Car Co., Racine, Wis. National Motor Vehicle Co., Indianapolis, Ind. Nordyke & Marmon Co., Indianapolis, Ind. Oakland Motor Car Co., Pontiac, Mich. Olds Motor Works, Lansing, Mich. Packard Motor Car Co., Detroit, Mich. Peerless Motor Car Co., Cleveland, Ohio. Pennsylvania Auto-Motor Co., Bryn Mawr, Pa. Pierce-Arrow Motor Car Co., Buffalo, N. Y. Pope Mfg. Co., Hartford, Conn. Premier Motor Mfg. Co., Indianapolis, Ind. Reo Motor Car Co., Lansing, Mich. Ricketts Auto Works, South Bend, Ind. Royal Tourist Car Co., Cleveland, Ohio. Selden Motor Vehicle Co., Rochester, N. Y. Stearns, F. B., Co., Cleveland, Ohio. Stevens-Duryea Co., Chicopee Falls, Mass. Studebaker Automobile Co., South Bend, Ind. Thomas, E. R. Motor Co., Buffalo, N. Y. Waverley Co., Indianapolis, Ind. Winton Motor Carriage Co., Cleveland, Ohio. White Company, Cleveland, Ohio. Woods Motor Vehicle Co., Chicago, Ill.

FIRST REGIMENT ARMORY-MAIN FLOOR. American Motor Car Co., Indianapolis, Ind. Atlas Motor Car Co., Springfield, Mass. Auburn Automobile Co., Auburn, Ind. Austin Automobile Co., Grand Rapids, Mich. Berliet Import Co., Chicago, Ill. Brush Runabout Co., Detroit, Mich. Buckeye Mfg. Co., Anderson, Ind. Cartercar Co., Pontiac, Mich. Chadwick Engineering Works, Pottstown, Pa. Dorris Motor Car Co., St. Louis, Mo. Fiat Automobile Co., New York. Gaeth Automobile Co., Cleveland, Ohio. Holsman Automobile Co., Chicago, Ill. Hupp Motor Car Co., Detroit, Mich. Jackson Automobile Co., Jackson, Mich. Kimball, C. P., & Co., Chicago, Ill. McIntyre, W. H., Co., Auburn, Ind. Moline Automobile Co., East Moline, Ill. Moon Motor Car Co., St. Louis, Mo. Mora Motor Car Co., Newark, N. Y. Ohio Motor Car Co., South Cincinnati, Ohio. Palais de l'Automobile, New York. Rapid Motor Vehicle Co., Pontiac, Mich. Rauch & Lang Carriage Co., Cleveland, Ohio. Regal Motor Car Co., Detroit, Mich. Renault Frères Selling Branch, Inc., New York. Simplex Motor Car Co., Mishawaka, Ind. Speedwell Motor Car Co., Dayton, Ohio. Staver Carriage Co., Chicago, Ill. Willys-Overland Co., Toledo, Ohio. York Motor Car Co., York, Pa.

COLISEUM BASEMENT.

Anderson Carriage Co., Detroit, Mich.
Black Mfg. Co., Chicago, Ill.
Cameron Car Co., Beverly, Mass.
Elkhart Motor Car Co., Elkhart, Ind.
F. A. L. Motor Co., Chicago, Ill.
Fuller Buggy Co., Jackson, Mich.
Grabowsky Power Wagon Co., Detroit, Mich.
Great Western Auto. Co., Peru, Ind.

Interstate Automobile Co., Muncie, Ind. Kissel Motor Car Co., Hartford, Wis. Lexington Motor Co., Inc., Lexington, Ky. Lion Motor Car Co., Adrian, Mich. Metz Co., Waltham, Mass. Rider-Lewis Motor Car Co., Anderson, Ind. Schacht Mfg. Co., Cincinnati, Ohio. Streator Motor Car Co., Streator, Ill. Wayne Works, Richmond, Ind. Zimmerman Mfg. Co., Auburn, Ind.

COLISEUM GALLERY AND ANNEX.

Ajax-Grieb Rubber Co., New York.

American Electric Novelty & Mfg. Co., New York.

Atwater Kent Mfg. Works, Philadelphia, Pa.

Aurora Automatic Machinery Co., Aurora, Ill.

Auto Improvement Co., New York.

Auto Parts Mfg. Co., Muncie, Ind.

Badger Brass Mfg. C., Kenosha, Wis.

Baldwin Chain & Mfg. Co., Worcester, Mass.

Batavia Rubber Co., Batavia, N. Y.

Bowser, S. F., & Co., Inc., Fort Wayne, Ind.

Breeze Carburetor Co., Newark, N. J.

Briggs & Stratton, Milwaukee, Wis.

Brown Lipe Gear Co., Syracuse, N. Y.

Byrne-Kingston & Co., Kokomo, Ind.

Connecticut Telephone & Electric Co., Meriden,

Conn.

Continental Caoutchouc Co., New York.

Continental Caoutchouc Co., New York.
Continental Motor Mfg. Co., Muskegon, Mich.
Consolidated Rubber Tire Co., New York.
Cook, Adam, Sons, New York.
Cook's Standard Tool Co., Kalamazoo, Mich.
Cowles, C., & Co., New Haven, Conn.
Cramp & Sons Ship & Engine Bld. Co., Philadelphia, Pa.

Dayton Rubber Mfg. Co., Dayton, Ohio.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Diamond Rubber Co., Akron, Ohio.
Dietz, R. E., Co., New York.
Dixon, Joseph, Crucible Co., Jersey City, N. J.
Duff Mfg. Co., Pittsburgh, Pa.
Edmunds & Jones Mfg. Co., Detroit, Mich.
Electric Storage Battery Co., Philadelphia, Pa.
Empire Tire Co., Trenton, N. J.
Excelsior Motor & Mfg. Co., Chicago, Ill.
Federal Rubber Co., Trenton, N. J.
Firestone Tire & Rubber Co., Akron, Ohio.
Fisk Rubber Co., Chicopee Falls, Mass.
Fox Metallic Tire Belt Co., 15 Murray St., New
York.

Gabriel Horn Mfg. Co., Cleveland, Ohio. G & J Tire Co., Indianapolis, Ind. Gemmer Mfg. Co., Detroit, Mich. Gilbert Mfg. Co., New Haven, Conn. Globe Machine & Stamping Co., Cleveland, Ohio. Goodrich, B. F., Co., Akron, Ohio. Goodyear Tire & Rubber Co., Akron, Ohio. Gray & Davis, Amesbury, Mass. Ham, C. T., Mfg. Co., Rochester, N. Y. Hancock Mfg. Co., Charlotte, Mich. Hardy, R. F., Co., New York. Harris, A. W., Oil Co., Providence, R. I. Hartford Rubber Works Co., Hartford, Conn. Hartford Suspension Co., Jersey City, N. J. Havoline Oil Co., New York. Hayes Mfg. Co., Detroit, Mich. Heinze Electric Co., Lowell, Mass. Herz & Co., New York. Hoffecker Co., Boston, Mass. Holley Bros. Co., Detroit, Mich. Imperial Brass Mfg. Co., Chicago, Ill. Jones Speedometer Co., New York Kokomo Electric Co., Kokomo, Ind. Leather Tire Goods Co., Newton Upper Falls, Mass.

Mass.
Link-Belt Co., Philadelphia, Pa.
Long Mfg. Co., Chicago, Ill.
Lovell-McConnell Mfg. Co., Newark, N. J.
McCord Mfg. Co., Detroit, Mich.
Mczger, C. A., New York.
Michelin Tire Co., Milltown, N. J.
Morgan & Wright, Detroit, Mich.
Mosler, A. R., & Co., New York.
Motsinger Device Mfg. Co., Pendleton, Ind.
Motz Clincher Tire & Rubber Co., Akron, Ohio.
Muncie Gear Works, Muncie, Ind.
National Carbon Co., Cleveland, Ohio.
National Coil Co., Lansing, Mich.
Never-Miss Spark Plug Co., Lansing, Mich.
Norton Company, Worcester, Mass.

N. Y. & N. J. Lubricant Co., New York. Oliver Mfg. Co., Chicago, Ill. Pantasote Company, New York. Pennsylvania Rubber Co., Jeannette, Pa. Randall-Faichney Co., Boston, Mass. Rands Mfg. Co., Detroit, Mich. Remy Electric Co., Anderson, Ind. Republic Rubber Co., Youngstown, Ohio. Ross Gear & Tool Co., Lafayette, Ind. Royal Equipment Co., Bridgeport, Conn. Sager, J. H., Rochester, N. Y. Shaler, C. A., Co., Waupun, Wis. Smith, A. O., Co., Milwaukee, Wis. Spicer Universal Joint Mfg. Co., Plainfield, N. J. Splitdorf, C. F., New York.
Sprague Umbrella Co., Norwalk, Ohio. Standard Roller Bearing Co., Philadelphia, Pa. Standard Welding Co., Cleveland, Ohio. Stewart & Clark Mfg. Co., Chicago, III. Stromberg Motor Devices Mfg. Co., Chicago, II Swinehart Clincher Tire & Rubber Co., Akree Ohio. Thermoid Rubber Co., Trenton, N. J. Timken-Detroit Axle Co., Detroit, Mich. Timken Roller Bearing Co., Canton, Ohio. United Manufacturers. U. S. Light & Heating Co., 30 Church St., No. York.

Valentine & Co., New York.

Veeder Mfg. Co., Hartford, Conn.

Vesta Accumulator Co., Chicago, Ill.

Warner Gear Co., Muncie, Ind.

Warner Instrument Co., Beloit, Wia.

Weed Chain Tire Grip Co., New York.

Warner Mfg. Co., Toledo, Ohio.

Wheeler & Schebler, Indianapolia, Ind.

Whiteley Steel Co., Muncie, Ind.

Whitney Mfg. Co., Hartford, Conn.

Witherbee Igniter Co., New York.

Collsum Gallery and Annex—Second Flox

American Motor Co., Brockton, Mass.

Consolidated Mfg. Co., Toledo, Ohio.

Excelsior Supply Co., Chicago, Ill.

Greyhound Motor Works, Buffalo, N. Y.

Harley-Davidson Motor Co., Milwaukee, Wis.

Hendee Mfg. Co., Springfield, Mass.

Hornecker Motor Mfg. Co., Geneseo, Ill.

Merkel Light Motor Co., Pottstown, Pa,

New Era Auto-Cycle Co., Dayton, Ohio.

Pierce Cycle Co., Buffalo, N. Y.

Reading Standard Co., Reading, Pa.

Reliance Motor Clele Co., Owego, N. Y.

FIRST REGIMENT ARMORY-GALLERY. Apple Electric Co., Dayton, Ohio. Benford, E. M., Mount Vernon, N. Y. Breakstone, S., Chicago, Ill. Chicago Wind Shield Co., Chicago, Ill.
Chilton Printing Co., Philadelphia, Pa.
Class Journal Co., New York. Detroit Motor Car Supply Co., Detroit, Mich. Driggs-Seabury Ordnance Corp., Sharon, Pa. Elite Mfg. Co., Ashland, Ohio. Excelsior Supply Co., Chicago, Ill. Fellwock Auto & Mfg. Co., Evansville, Ind. Flentje, Ernst, Cambridge, Mass. Franklin, H. H., Mfg. Co., Syracuse, N. Y. Fulton-Zinke Co., Chicago, Ill. Garage Equipment Co., Milwaukee, Wis. Gasoline Motor Efficiency Co., Jersey City, N. Gates-Osborn Mfg. Co., Marshalltown, Ia. High Frequency Ignition Co., Los Angeles, Cal. Lavalette & Co., New York. Mesinger, H. & F., Mfg. Co., New York. Morrison-Ricker Mfg. Co., Grinnell, Ia. Motor, New York. Motor Parts Co., Plainfield, N. J. Motor Specialty Co., Detroit, Mich. Overland Sales Co., Chicago, Ill. Perfection Spring Co., Cleveland, Ohio. Simms Magneto Co., New York. Smith, Fred W., Aberdeen, S. Dak. Smith, Fred W., Aberdeen, S. Dak, Standard Auto Supply Co., Chicago, Ill. Standard Varnish Works, Chicago, Ill. Triple Action Spring Co., Chicago, Ill. Troy Carriage Sunshade Co., Troy, Ohio. Twentieth Century Motor Car Supply Co., Sox Bend, Ind.

Universal Tire Protector Co., Angola, Ind. Vanguard Mfg. Co., Joliet, Ill. Vehicle Top & Supply Co., St. Louis, Ma.

### GARAGE AND SALESROOM.

Garage Notes.
Sacramento, Cal.—Herbert E. Schroeder has secured a permit to open a garage on Sacramento street, between Baker and Lyon streets, despite a vigorous protest from two adjacent property owners.

Denver, Col.-W. C. Fawcett Motor Company will erect a two story, 50x150 foot garage and salesroom at 1249-1255 Broadway the first of the year. The estimated cost is \$25,000.

Washington, D. C .- Rudolph & West will build an addition to their establishment to be devoted chiefly to auto supplies.

Jacksonville, Fla.-Womble & Co. have opened a garage and repair shop in the east end of Holland's carriage

Chicago, III .- The Nyberg Automobile Works has taken a lease of the premises 2438 Indiana avenue for a period of fifteen years, on which will be erected a four story, 63x175 foot reinforced fireproof structure, which will be connected by overhead bridges with the present Nyberg building on Michigan avenue. The combined buildings will have a floor space of 80,000 square feet.

Chicago, III .- The Walden W. Shaw Company, importer of the Berliet car and owner of the Shaw taxicab service, have sold the lease on the salesroom and garage on Twenty-first street to the Oldsmobile Company, who at present occupy the adjoining building, and plan to secure a plot in the heart of the business section on which they will erect a 100x175 foot, four story, concrete garage and salesroom.

Indianapolis, Ind .- William H. Baker has been granted a permit to erect a two story brick garage at 325 North Delaware street. The building will have a floor area measuring 32x120 feet, and will cost \$6,500. The lower floor is to be used as a garage and the upper as a repair shop.

Indianapolis, Ind .- About sixty Indiana agents of the Buick Motor Company were entertained by the Indianapolis sales branch, of which R. H. Losey is manager, during the week of December 13. The agents inspected the 1910 models and were entertained at a banquet at the Columbia Club. On Sunday, December 19, the party was taken in a special car to the factory at Flint, Mich.

Iowa City, In .- Joseph O'Leary has leased the ground floor of two new buildings on the corner of Dubuque and Burlington streets, in which he will conduct a garage.

Winfield, Kan .- A garage is to be erected on the lots on Tenth street facing the Odd Fellows building. Roy Nunn has taken a lease of the premises.

New Orleans, La .- A. Aschaffenberg will commence the erection of a garage

and salesroom on St. Charles street the first of January. L. H. Fairchild is planning for another garage on the same street.

New Orleans, La.-Emilien Perrin will erect a two story, gox too foot fireproof garage and salesroom on Dryades and Lafayette streets, to cost \$25,000. A lease has been taken of the premises by the Crescent City Automobile Company until September 30, 1915.

New Bedford, Mass .- James Holsted has opened a garage at 244 Purchase street and will combine a repair shop with it.

Grand Rapids, Mich .- George Bandfield and James M. Webster will open a

Kansas City, Mo .- The Economy Sales Company, composed of H, M. Brooks and James G. White, have located at 1424 Mc-Gee street, to handle the Economy car, manufactured at Joliet, Ill. The company controls the sales of this car in forty counties in Missouri and Kansas.

Kansas City, Mo .- The Park Board of Kansas City has adopted a resolution to the effect that hereafter the board will oppose the building of garages upon boulevards where the approaches to them must be from boulevards.

Fremont, Neb .- The Cuddeback Automobile Garage has been taken over by the First National Bank to satisfy claims. Lee Beatty, who was foreman of the repair shop, has been placed in charge of the garage.

Rochester, N. H .- George W. Shaw has purchased the Wilson garage in this city.

New York, N. Y .- Henry Buttman will build a five story 50x85 foot garage on 167th street, west of Amsterdam avenue, to cost \$65,000.

Poughkeepsie, N. Y .- The Ryder Garage Company have purchased the building at 42 Market street and will remodel it into a garage. In the rear of the present building will be erected a brick and cement building 200 feet long, part of which will be two stories high. The second story will be devoted to repairs exclusively.

Rochester, N. Y .- J. V. Locklin will open a garage on State street, opposite Burgess Hall, in January.

Syracuse, N. Y .- The Auto Sales Company of Syracuse have purchased the automobile business and show room of the Empire Motor Car Company at 244 West Genesee street. C. H. Otis, formerly with the Genesee Motor Car Company, has been made manager of the Auto Sales Company, who will handle the Regal car,

White Plains, N. Y .- Paul & Almy, who have conducted the City Garage on Martine avenue since it was opened, have purchased the property for \$24,000. An extension of 50 feet, used as a machine shop, was recently completed.

Williamsbridge, N.Y .- Baisley & Watson will erect a two story garage on Williamsbridge road, north of Poplar street, to cost \$40,000.

Columbus, Ohio .- Fred Wood and Andrew Auble, two well known automobile men of Akron, have purchased the business of E. Shriber Reese at 2108 Euclid avenue, Cleveland, which has been conducted under the name of the Reese Motor Car Company. In the purchase they secured the agency for the Royal and Cor-

Portland, Ore .- The Regal agent, Karl McCroskey, has moved to Fifteenth and Burnside streets, and occupies a portion of the garage of the Graham Motor Car Company.

Portland, Ore .- The Willamette Auto Supply Company has been established, The new firm will have the local agency for the McIntyre car. B. R. Gunther and W. B. Neff, the latter Northwest manager for the McIntyre, compose the firm. A definite location has not yet been decided upon.

Portland, Ore.-The Packard Automobile Company will build a large garage at once on Twenty-third street, near Washington, on the lot recently purchased by the Realty Associates. The structure will be a two story brick, with reinforced concrete floor, for both garage and salesroom. It will cost \$29,000. Frank C. Riggs is the local agent of the Packard Company.

Philadelphia, Pa .- The Wayne Davis Company, representatives for the Everitt "30" and the Matheson, have purchased the property at the northwest corner of Broad and Race streets, from which the Matheson is handled.

Philadelphia, Pa.-The Palmer & Singer Distributing Company will move into a new fireproof building at 36 North Broad street at the beginning of the new year,

Philadelphia, Pa,-Harry L. McCullough has taken the agency for the Speedwell and the Parry cars, and has opened a sales room at 1416 Vine street.

Reading, Pa .- Henry M. Kurtz, of 440 Olney street, is erecting a two story concrete garage in the rear of his home.

San Antonio, Tex .- Frank Blackburn, of Fort Scott, Kan., and F. A. Hornaday, of this city, have organized the Texas Auto Company, and are building a garage, which will be completed shortly after New Year's. They will handle the Packard gasoline and Woods electric cars. Mr. Blackburn will have charge of the garage.

West Derby, Vt .- E. A. Aubin, formerly of Nashua, N. H., will open a garage and repair shop to be known as the West Derby Garage.

Norfolk, Va .- The Seaboard Auto Company have remodeled a former laundry on Tenth and Granby streets into a garage, and in the rear of same they will erect a two story repair shop. The company expect to occupy their new quarters January I.

Charleston, W. Va .- A garage to be known as the Triple State Garage will be erected on Kanawha street, near the bridge. Lawrence F. Beller will be manager.

Milwaukee, Wis .- The Studebaker Automobile Company are endeavoring to secure a site for a garage and salesroom. They are now temporarily located with the Sanger Automobile Company on Farwell avenue.

Superior, Wis .- The Ross Motor Car Company, agents for the Studebaker lines, has established a repair shop, which is one of the largest in the Northwest. The shop is one of the first in this territory to care exclusively for motor car repairs. H. M. Brown, of Chicago has been engaged to take charge of the repair department.

#### New Agencies.

MACON, GA .- The Burns Motor and Supply Co., National.

MACOMB, ILL.-A. T. Ewing & Son, Great

DES MOINES, IA.—Ideal Auto Co., White. PORTLAND, ME.—The Portland Motor Mart,

BOSTON, MASS .- The J. W. Boman Co.,

Everitt "Thirty." WOOD LAKE, MINN .- C. W. Collins and W.

O. Dillingham, Buick.

ST. JOSEPH, MO .- Dr. U. G. Crandell, Selden. TROY, N. Y.-John Burdick, Alco. ATHENS, OHIO.-R. C. Fulton & Co. (for

Athens County), Maxwell. CAMBRIDGE, OHIO.-F. P. Arnold (for

Guernsey and Muskingum County), Maxwell. CIRCLEVILLE, OHIO .- M. A. Ryan (for

Pickaway and Ross counties), Maxwell. COLUMBUS, OHIO.—The McDonald Automo-

bile and Livery Co., Buick and Welsh. COLUMBUS, OHIO.-Bucher Engraving Co.,

American roadster. COSHOCTON, OHIO .- S. Siegrist & Sons (for

Coshocton and Tuscawras counties), Maxwell. DELAWARE, OHIO .- O. W. Bonnell (for

Delaware County), Maxwell.

JACKSON, OHIO.-J. B. Griffith (for Jackson County), Maxwell,

LANCASTER, OHIO,-W. P. Bietzacher (for Fairfield County), Maxwell.

LONDON, OHIO.—Dwyer Brothers (for Madison County), Maxwell.

MARION, OHIO.—J. W. Patton (for Marion

VERNON, OHIO .- R. W. Ferris (for

Knox County), Maxwell. SPRINGFIELD, OHIO,-E. D. Valentine (for

Clark County), Maxwell.

URBANA, OHIO .- W. A. Biddle (for Campaign and Union counties), Maxwell, WASHINGTON COURT HOUSE, OHIO,-

Martin & Michael (for Fayette County), Maxwell. WILMOT, OHIO .- Amos Johnson (for Holmes County), Maxwell.

PORTLAND, ORE .- George O. Barnes,

PORTLAND, ORE.-Robert Simpson, 261

Front street, Auburn.
WATERVILLE, ORE.—Alfred S. Witter, Ford. PHILADELPHIA, PA .- H. L. McCullough, 1416 Vine street, Parry and Speedwell.

PHILADELPHIA, PA.—Henry Petri, South Camac street, Black Crow.
PITTSBURG, PA.—The Central Automobile Co., Center avenue, Regal.

### ABERDEEN, S. DAK .- The Hub City Auto

Co., Kisselkar and Empire. SEATTLE, WASH.—The Poison Implement Co., Maxwell and Randolph trucks.

#### Coming Events.

December-Chicago, Ill., One Mile Straightaway Trials, Chicago M. C., during Christmas week,

December 25 to January 1-Columbus, Ohio, Automobile Show, Auditorium, Columbus A. C.

December 31 to January 7-New York City Annual Show, Grand Central Palace, American Motor

Car Manufacturers' Association.
January 1—Philadelphia, Pa., Roadability Run
from Philadelphia to Wilmington, Del., and return, Century Motor Club.

January 8-15-New York Annual Show, Madison Square Garden, Association of Licensed Automobile Manufacturers.

January 10-16-Portland, Ores, Annual Automobile Show.

January 15-29—Philadelphia, Pa., Automobile Show, Second Regiment Armory, January 17-22—Kansas City, Mo., Automobile Show, Convention Hall, Motor Car Trade Association.

January 24-29-Portland, Ore., Automobile Show, Armory.

January 24-29-Detroit, Mich., Automobile Show, Wayne Hotel Gardens.

January 24-30-Washington, D. C., Fourth Annual Show, Convention Hall, Automobile Dealers'

February-Grand Forks, N. Dak., Automobile

February 4-6—New Orleans, La., Annual Mardi Gras Speed Carnival, New Orleans A. C. February 5-12—The Ninth Annual National Show at Chicago, Ill., National Association of Au-tomobile Manufacturers.

Pebruary 14-19—Buffalo, N. Y., Automobile Show, Broadway Arsenal, A. C. of Buffalo and Buffalo Automobile Trade Association.

Lavalette & Co., makers of the Eisemann magneto, have brought out a new type specially designed for aeronautic work. Part of the instrument is made of aluminum, and the heaviest model weighs only 161/2 pounds, while the lightest of the four cylinder type weighs but 11 pounds. Five styles of these magnetos are made.

#### To Handle O. M. S. Parts.

The Q. M. S. Company (Quincy, Man chester, Sargent) announce that the Motor Parts Company will hereafter handle their automobile specialties. W. D. Sargent à president, F. F. Kister secretary and treaurer and C. H. Holbrook sales manager of the new company. The general offices of the Motor Parts Company are located at Plainfield, N. J., from which point the territory east of Detroit will be covered in the West their automobile step business will be taken care of by John C. Hoof, with offices in the First National Bank Building, Chicago. On their Auto Cle wench business, as in the past, the Factory Sales Corporation, 1438 Michigan avenue, Chicago, will act as distributing agents for the Western territory, and the Frank Mosberg Company, Attleboro, Mass., for the Eastern territory.

#### Good Year in Indianapolis.

Automobile dealers of Indianapolis report that sales this year have been much in cacess of those of 1908. It is estimated that the sales during the 1909 season amounted to between 3,500 and 4,000 cars. This large number is accounted for by the fact that almost all Indianapolis agents are distrilators for the greater part or all of the State Advance sales of 1910 models have been satisfactory, several dealers having disposed of from 30 to 50 per cent. of their 1918 allotments.

### Requa-Gibson Company Formed.

The Requa-Gibson Company has been organized under the laws of the State of New York, and has taken over the internal combustion engine patents of Hugo C Gibson, which were formerly controlled by the Requa-Coles Company.



PROMINENT DEALERS AT DINNER FOLLOWING ORGANIZATION OF METZGER MOTOR CALL COMPANY'S SALES DEPARTMENT IN DETROIT RECENTLY.

### NOTES OF THE INDUSTRY AND THE SPORT.

#### Miscellaneous Notes.

Some tests made by J. D. Maxwell, of the Maxwell-Briscoe Motor Company, are said to have shown that cactus fibre is an excellent brake lining material.

The New Process Rawhide Company, Syracuse, N. Y., have purchased a half acre tract adjoining their plant on Plum street, to be used for further factory extensions.

The New York School of Automobile Engineers, 146 West Fifty-sixth street, New York city, have decided to give a free lecture once a month throughout the winter.

The city clerk of Salina, Kan., has so far issued eighty-one automobile license tags at \$2 each, under the recently adopted ordinance, and also thirteen duplicate tags for garages at \$1 each.

The Overland Automobile Company have placed a contract for brass and steel parts for their automobile engines with the Morrow Ball Bearing Drill Chuck Company, La France street, Elmira, N. Y.

It is reported that the Shawmut Motor Company have obtained an option on a factory property in South Boston, and will begin operations the first of the year if they secure sufficient financial support.

The Auto-Axle Company, of Fort Wayne, Ind., are remodeling the old windmill factory and installing machinery for the manufacture of automobile axles. They expect to begin operations by January 15.

The Croxton-Keeton Motor Company, of Massillon, Ohio, will erect an 880x144 foot addition to their plant on Walnut and Canal streets. Work will begin at once, and the building will be completed early in the spring.

C. C. Tuxbury, of Grand Rapids, Mich., has had plans prepared for the construction of a one story, 65x150 foot building on Fulton and Market streets, to be used for the manufacture of automobile engines and auto parts.

The Swinehart Clincher Tire and Rubber Company, of Akron, Ohio, who formerly manufactured only solid tires, have begun the manufacture of pneumatics, and expect to turn out 100 tires per day in January and February.

The Simms Magneto Company have opened large premises at 1780-82 Broadway, New York, for distributing, assembling, repairing and fitting their magnetos. Frederick R. Simms, of the parent company in London, is at present in this country directing the establishment of the new quarters

The Hendee Manufacturing Company, of Springfield, Mass., manufacturers of the Indian motorcycle, have opened a branch in London, England. This step was preceded by a season's participation in foreign motorcycle events. An Indian motorcycle fit-

ted with Simms magneto recently broke several world's records on the Brooklands track.

The Worth Automobile Company, of Kankakee, Ill., are remodeling the old horse nail factory preparatory to occupying it as an automobile factory the first of the year.

Thos. B. Jeffery & Co., of Kenosha, Wis., makers of the Rambler, will build a large new office building next spring. Plans have already been accepted and work will begin as soon as the frost is out of the ground.

At the coming Grand Central Palace Show 12,000 square feet of floor space will be occupied by the members of the Importers' Automobile Salon, an organization which was first formed several years ago to hold a separate show for foreign cars.

The management of the automobile show to be held in Portland in January have decided not to allow curb brokers' entries, and to this end a regulation was made that no dealer who had not been located in Portland sixty days prior to the show will be permitted to buy floor space.

The Lovell-McConnell Manufacturing Company, Newark, N. J., manufacturers of Klaxon horns and other automobile accessories, have purchased a building site on White and Emmet streets, on which they are erecting a machine shop, a foundry, a power plant, a storage building and a garage.

The recently organized Abbott Motor Company, of Detroit, are erecting a factory at Waterloo and Beaufait streets, on the Belt line, to cost about \$125,000. The buildings are to be of brick, concrete and frame, two stories high, and when completed will cover the entire site, which measures 600x155 feet.

The Cadillac Motor Car Company, of Detroit, Mich., sent a shipment of twenty-one of their Cadillac Thirties, valued at \$33,600, by the steamer Makura, which left Vancouver, B. C., on December 14, to Australia. This is probably one of the largest single foreign shipments of American cars that has ever been made.

It is reported that the Racine-Sattley Company, of Racine, Wis., with branches in several other Western cities, will soon engage in the manufacture of automobiles. David Connolly, a motor car designer of Pontiac, Mich., has been engaged by the company, which seems to confirm the rumors.

The Weyher Machine Company, of Whitewater, Wis., has produced the first model of a one-half ton automobile truck equipped with an 18 horse power engine. Trials in wintry weather have been successful, and the company proposes to increase its production at once. The company has orders for several trucks, contingent upon

the success of its first product. The wheels are larger than the usual equipment of automobile trucks.

C. A. Metzger & Co., of New York city, have bought the factory of the Newark Rivet Works, Newark, N. J., in which the Friction wind shield, recently described in our columns, has been manufactured. The factory will be used for the wind shield branch of the Metzger Company's business.

The Bailey Oil Company is being organized at Toledo, Ohio, by F. A. Barker, of the Willys-Overland Company, and F. T. Bailey, formerly of the A. W. Harris Oil Company. The company will bring out a line of lubricants particularly adapted to Overland cars, and later will enter the field with a line for general use.

According to figures compiled from the registration records of the Secretary of State of Illinois, the Buick led among the registrations for November with 41 cars, followed by Ford, with 37; Packard, 32; Maxwell, 24; Studebaker, 21; Woods, 20; Winton, 18; Cadillac, 18; Chalmers-Detroit, 15; Peerless, 12; Reo, 12; Rambler, 11, etc.

The Racine Foundry Company has been incorporated at Racine, Wis., with a capital stock of \$40,000 to produce casting especially for the automobile trade. H. R. Birdsall, Henry Graham, W. C. Palmer and others are backing the concern. The Progressive Foundry Company is another new Racine concern that will produce castings for this trade. The capital stock is \$10,000, and the incorporators are W. J. Kostermann, Dora Kostermann and Mary E. Geb.

#### Club Notes.

The Philadelphia A. C. now has a membership of 1,014, having elected forty-one new members at its last election.

The Louisville (Ky.) A. C. is championing the proposed Newcomb bill, to be introduced in the Kentucky Legislature during the next session, which imposes heavy penalties on joy riding.

A joint meeting of the Commonwealth and Massachusetts motorcycle clubs of Boston was held on December 16, for the purpose of organizing a new motorcycle association, which will probably be known as the Boston Motorcycle Club.

At a meeting of the Mobile (Ala.) A. C., in its clubrooms at 405 City Bank Building, on December 8, it was decided to get into communication with motorists in all parts of the State, with the object of forming a State association to join the A. A. A.

The Delaware A. A. has issued its year book for 1910, which contains a list of the officers and the members of the association, the constitution and bylaws and the advantages of membership in the association and the A. A. A.; a digest of the State laws

relating to automobiling and descriptions of a large number of automobile routes in the East.

The winter endurance contest of the A. C. of Worcester, Mass., which was to be held on Friday, December 17, had to be abandoned on account of lack of entries.

The following nominations have been made for officers of the Denver Motor Club for 1910: William D. Nash, president; N. J. Vroom, vice president; C. P. Allen, treasurer, and G. L. Wands, secretary.

Officials of the A. C. of St. Louis have requested the police department to stop the malicious strewing of tacks on the streets, which is said to have caused tire troubles to a great many motorists during the past several weeks.

The executive committee of the Louisville (Ky.) A. C. has secured two rooms in the Commercial Building at Fourth avenue and Main street for office purposes. One of the rooms will be the members' room and the other a private office for the assistant secretary.

At a recent meeting of the Columbus, Ohio, A. C. nineteen applications for membership were favorably acted on. This is the first of the large number of new members anticipated during the winter from the campaign for new members which was started recently. The club now has about 400 members.

The Chicago A. C. will hold an annual century run over the Elgin-Aurora course on January 1, starting from the clubhouse in Chicago at midnight. A supper and dance at the Fox River Country Club will be one of the features of the run. The arrangements are in charge of the runs and tours committee, of which B. B. Ayers is chairman.

The A. C. of New Rochelle, N. Y., at its recent annual meeting elected the following officers: W. B. Ogden, Jr., president; Edmund Eckart, first vice president; G. W. Bennett, second vice president; F. D. Le Count, treasurer, and F. M. Carpenter, secretary. A sum of \$4,000 was subscribed for to make a first payment on the new \$25,000 clubhouse.

The A. C. of Pittsburg, Pa., has had the distance from Seventh avenue and Grant boulevard to Craig street measured. It is slightly less than 2½ miles, and, allowing for sharp curves and slow-downs at Washington and Thirty-second streets, this distance cannot be covered in less than seven minutes without violating the law. It is between these two points that most arrests for speeding are made.

The A. C. of Newburgh, N. Y., held its annual meeting at the Palatine Hotel on December 15. Fifteen new members were elected. The following officers were elected: Walter H. Whitehill, president; Chas. E. Stafford, vice president; Geo. S. Weller, secretary, and Geo. R. Mitchell, treasurer. After the business meeting a luncheon was served, at the conclusion of which a number of addresses were made. Bert Van Tuyle, secretary of the New York Stafe

A. A., was present and spoke to the members of the club on the bills which will be introduced in the Legislature at Albany this winter, on the evil of speed traps, etc.

The San Francisco Motor Club held its annual meeting on December 10 and elected the following officers: Henry M. Owens, president; H. L. Owesney, vice president; C. S. Richardson, second vice president; W. R. Johnston, secretary, and C. E. Starret, treasurer. During the past year the club compiled a tour book which was distributed among the members. According to the report of Treasurer Starret the club had a treasury balance of \$93 on December 1, with no debts.

### New Incorporations.

The Fort Wayne Auto Axle Company, Fort Wayne, Ind.—Capital stock, \$100,000.

The Muskegon Motor Car Company, Muskegon, Mich.—Capital stock increased from \$20,000 to \$30,000.

The Brown Auto Carriage Company, Cleveland, Ohio.—Capital stock increased from \$15,000 to \$50,000.

The Jonz Auto Company, Beatrice, Neb.
—Capital stock, \$100,000. Incorporators, C.
Chas. Jones and others.

The Keating Garage and Engine Company, Oswego, N. Y.—Capital stock increased from \$10,000 to \$20,000.

Dan Canary Taxicab Company, Chicago, Ill.—Capital stock, \$15,000. Incorporators, A. R. Hurlbert, F. J. Haake and Sidney S. Gorham.

The Neches Motor Car Company, Beaumont, Tex.—Capital stock, \$10,000. Incorporators, W. C. Gray, Walter Leight and Geo. H. Leight.

The Cutting Motor Company, Manhattan, N. Y.—Capital stock, \$10,000. Incorporators, H. P. Jones, H. Rosenberg and H. M. Browne.

The McAdoo Garage Company, Greensboro, N. C.—Capital stock, \$10,000. Incorporators, William D. McAdoo, C. M. Lea and J. M. Rosenblatt.

Belgrade Automobile and Garage Company, Belgrade, Me.—Capital stock, \$10,000. Incorporators, Chas. A. Hall, Harold F. Travis and others.

The Bayless Motor Car Company, Louisville, Ky.—Capital stock, \$6,500. Incorporators, W. K. Bayless, T. C. Bayless, E. B. Bayless and E. B. Chenault.

The White Star Taxicab and Garage Company, Chicago, Ill.—Capital stock, \$50,000. Incorporators, Harry J. Guttman, W. J. Stewart Hyde and E. D. Fritch.

The Johnson Motor Car Company, Dover, Del.—Capital stock, \$100,000. Incorporators, James H. Johnson, of Philadelphia, and Edwin R. Cochran, of Wilmington, Del.

The Southern Automobile Company, Spartanburg, N. C.—Capital stock, \$10,000. Incorporators, A. B. Calvert, Dr. Webb Thomson, A. L. Crutchfield and John B. Cannon.

The Rae Electrical Vehicle Company, a Delaware corporation with headquarters in

Boston, has increased its capital stock from \$250,000 to \$20,000,000, and has changed its name to the Rae Electrical Equipment Company.

The Kauffman Vehicle Manufacturing Company, Miamisburg, Ohio.—Capital stock, \$100,000. Incorporators, T. J. Kauffman, H. B. Lyons, D. H. Allen, Jacob Klee and George Behlen.

The Johnstown Motor Car Company, Johnstown, N. Y.—Capital stock, \$15,000. Incorporators, Fred L. Carroll, Chas. A. Miller, Godfrey Hillabrandt, Henry Veghte, D. A. Hays, E. Lucas and J. D. Pierson.

### Trade Personals.

William Hyslop, of Toronto, Ont., well known in automobile circles and the leading dealer in that city, arrived in New York from Paris on Tuesday.

J. M. Hill has resigned his position with the Alden Sampson Manufacturing Company, of Pittsfield, Mass., the resignation having taken effect on December 13.

W. A. Schuler, formerly with the Nieuport Magneto Company, of Paris, has joined the Simms Magneto Company as manager of the New York branch.

D. D. Cummins, until recently connected with the Mankato Auto Company, has accepted a position as sales manager of the Four Traction Auto Company, of Mankato.

S. H. Pierce has been appointed manager of the Denver Ajax tire agency. Mr. Pierce some years ago was salesman in the Chicago Ajax branch, and later had charge of the Minneapolis branch.

Jesse Froehlich, of the Times Square Automobile Company, of New York, has just returned from a trip abroad, and reports that he secured the American agency for the Goggenau trucks, built by the South German Automobile Works, in Goggenau, Baden.

Courtland D. Cramp, of the William Cramp & Sons Company, and Minor Harvey, Jr., of the Morse Williams Company. Philadelphia, were in New York early this week in the interests of their respective companies. Both reported a flattering outlook for 1910.

Charles M. Hall, of the Hall Lamp Company, Detroit, Mich., has been elected a director of the Motor and Accessory Manufacturers, to fill out the unexpired term of H. S. White, formerly of the National Tube Company, of Pittsburg.

E. F. Herst, formerly with the Warner Gear Company, of Muncie, Ind., and later with the Chalmers-Detroit Motor Company, has been appointed superintendent of the transmission gear department of the Brown-Lipe Gear Company, Syracuse. N. Y.

C. W. Moody, formerly manager of the Pennsylvania Rubber Company's Chicago branch, has accepted the position of general sales manager of the Swinehart Tire and Rubber Company, Akron, Ohio. Mr. Moody has been in the tire business for the past five years in Cleveland and Chicago.

### The Horseless Age

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### Tenth Annual International Automobile Show, Grand Central Palace, New York.

When the doors of the Grand Central Palace are thrown open on New Year's eve, Friday, December 31, Motordom will see the annual show season ushered in with the largest exposition ever held by the American Motor Car Manufacturers' Association. In this somewhat ancient structure, which seems to be composed largely of confusing

nooks and corners, this tenth annual show of the association will reveal between 300 and 325 exhibitors displaying a varied conglomeration of fine cars, large and small, accessories and other things pertaining to the automobile. In conjunction with the A. M. C. M. A., the Importers' Automobile Salon will display foreign cars, and the Motor and Accessory Manufacturers' Association, which includes the foremost makers of accessories and parts, products in these lines.

Of the number to be represented, eighty-four are exhibitors of complete cars, sixty-eight being pleasure vehicle makers exclusively and nineteen showing commercial cars, either alone or together with pleasure vehicles. Twelve of the eighty-four are foreign exhibits.

Of the pleasure types shown, prices to suit all sorts of pocketbooks will be met. From the little \$485 Brush runabout to the \$7,000 and up Fiat and Renault limousines there is a wide range of values, while the unique Metz plan car of small dimensions can be had for the small sum of \$378—and on instalments at that. The curious selling plan of this car is of interest in that the car is delivered piecemeal at so much per piece, the sections costing about \$25 each, and after buying all the parts on "easy payments" they can be as-

sembled and the car put on the road. Commercial vehicles range from a \$500 delivery cart to a 10 ton truck listed at \$6,500. The total value of the cars displayed is over \$1,000,000.

Among the accessory exhibits will be found about every sort of device on the market intended for the motorist and manufacturer of cars. In addition to those who now have floor space, fully fifty other concerns are now on the waiting list, hoping

for an opportunity to squeeze in somewhere. As it is, 72,000 square feet of floor area will be occupied, every inch of which was sold three months ago. This is an increase of 4,000 square feet over last year.

Forty of the complete vehicle exhibitors are members of the A. M. C. M. A., while in the accessory division ninety-five of those

Grand Central Palace Lexinoton Average DEC. 3157 to JAN. 750

SMALL POSTER OF THE SHOW.

expected to be present are members of the Motor and Accessories Association. The balance are unattached. It is true that several makers of cars which are now licensed under the Selden patent will show their products at this exposition, which has always been known as the "unlicensed" or "independent" show. This is the first time that this has occurred, although the reason is most simple. These companies, such as the Maxwell-Briscoe Motor Company, the

Dayton Motor Car Company and a few others, had taken space in the A. M. C. M. A. show some time before the recent decision of Judge Hough upholding the Selden patent. Upon this decision being handed down, these manufacturers applied for and were admitted to membership in the Association of Licensed Automobile Manufac-

turers upon payment of back royalties declared to be due the Licensed Association. This, however, by no means signified that they left the A. M. C. M. A., or that they were expected to. According to officers of the latter association, the impression that the A. M. C. M. A. was formed to fight the Selden patent is an erroneous one, and there is absolutely no reason why the manufacturers above mentioned should not exhibit at the Palace.

### SHOW COMMITTEE.

Those responsible for the greater or less success of the coming show are the members of the association's show committee, and, of course, Alfred Reeves, general manager of the A. M. C. M. A., and his corps of assistants. This show committee is composed of R. E. Olds, chairman; Benj. Briscoe, E. Rand Hollander, S. H. Mora, H. O. Smith and D. J. Post. The calibre of these men is so well known that no eulogy is necessary here. The publicity for the event is again in the hands of Leon Myron Bradley and Duncan Curry.

SHOW HISTORY.

A glance backward at the shows of the past held under the auspices of "the independents" reveals the fact that during the past four years they have been held in the same old Grand Central Palace, with an increase of exhibitors each successive year, while prior to that time the shows were

while prior to that time the shows were held in Madison Square Garden, where the Licensed Association has more recently held forth. The first automobile show ever held in America was under the joint auspices of the National Association of Automobile Manufacturers and the Automobile Club of America, at the Garden, with sixty-nine exhibitors. Nowadays, whenever we happen to see a car of the type shown that year we smile. Those

were the days of hot tube ignition, rear entrance tonneaus, with doors that would fly open and drop passengers, and other historic features. In 1901 the club and the Manufacturers' Association in the same building increased their number of exhibitors to ninety-two, a material increase that held out great hopes for the future. No show was held in 1902, but in 1903 the number showing at the Garden under N. A. A. M.-A. C. A. auspices was more than doubled-198. In 1904 there were 205; in 1905, 247. At the time of the 1905 show the Association of Licensed Automobile Manufacturers secured a lease of the Madison Square Garden for automobile show purposes for a number of years, and this resulted in the holding of two simultaneous shows in this city during January, 1906, one by the Licensed Association in Madison Square Garden, and the other by the Automobile Club of America in the adjoining Sixty-ninth Regiment Armory. Since that time there have been two shows in this city every season, a "licensed" and an "unlicensed" one. The next unlicensed show was held under the joint auspices of the A. C. A. and the A. M. C. M. A. in the Grand Central Palace late the same year, 1906. Neither of the two unlicensed shows of 1906 compared with the single show of 1905 in respect to number of exhibitors, only 218 displaying at each. Nineteen hundred and seven, the panic year, saw the first early fall show, held in October, with 257 concerns displaying, while the last show, held December 31, 1908-January 7, 1909, eclipsed those of former years, with 286 exhibitors. This was the first time the show was held without the co-operation of

the Automobile Club. This season, with upward of 300 on the list, a new record is being established.

NEW YEAR'S EVE OPENING.

The selection of New Year's eve as an opening date, which is rather odd, was tried last winter, and it proved most successful in spite of the fact that it was claimed by some that people would not care to visit an automobile show on such a great date in the metropolis. The fact that so many attended and paid admission that opening night proved how interested New Yorkers and others are in motor cars. Inasmuch as so many excursions to New York from all parts of the country are run around the first of the year, the date proves a convenient one for dealers and others in many cities. After attending the opening they can go out and celebrate with the rest of New York.

Invitations have been extended to more than 5,200 dealers and manufacturers throughout the United States; also a number in Mexico and Canada, and in addition to these 3,500 carriage builders have been asked to attend. Special invitations have been sent to Mayor McClellan, who retires from office the night the show opens; Mayor-elect William J. Gaynor, and numerous other city officials and celebrities.

DECORATIONS.

No expense has been spared to make the interior of the Palace attractive, and to provide an artistic setting for the cars. The show committee has æsthetic tastes, and believes in the theory that "fine feathers make fine hats." Anyway, the committee promises the most beautiful decorative scheme ever seen in that building, although it is not

intended to have the "art" outshine the beauty of the cars themselves. The general scheme executed by Messra. Unitt and Wickes is a trellis, or gigantic arter, the designers hoping to have the cars on the main floor appear as though parked in a beautiful fairyland garden. Cresping wand entwining the trellis will be verdan vines, also flowers and cages with singing birds, while about the pillars and posspotted palms will hover.

As a number of the cars will be of to eign manufacture an effort has been make to make a portion of the decorations are national in character, and, according to the show press agent, "Italy, Franch and Gemany have been searched for cunning little floral novelties that are in a way symbolic of the countries the cars represent."

Aside from the trellis garden idea, the effect involves a lattice and landscape aspect, while thousands of electric light bulbs and chandeliers will give ample itlumination for the brilliant automobiles. The color scheme is Nile green on the lattice work, with a soft Caen stone tackground, while through the grapevine hung roof blue sky will be faintly seen. The spectacular feature of the decorations will be the huge electrical marble fountain at the end of the main aisle, where last years statuesque group stood. The fountain is about 16 feet long and 14 feet high, and in back of it will be a huge mirror. It will have mechanical color effects, produced by a rotary pump and a combination of colored mirrors electrically operated. The perte cochère of the Palace will be elaborately decorated and illumined; also surmounted with the reproduction of the familiar picture of "Miss Liberty at the Wheel," done in electric lights.

The signs on the main floor and two upper galleries proclaiming the names of the exhibitors and their products will be in raised gilt Egyptian letters on a green background. In the court beneath the trellis on the main floor, however, there will be standards on posts with illuminated alabaser signs.

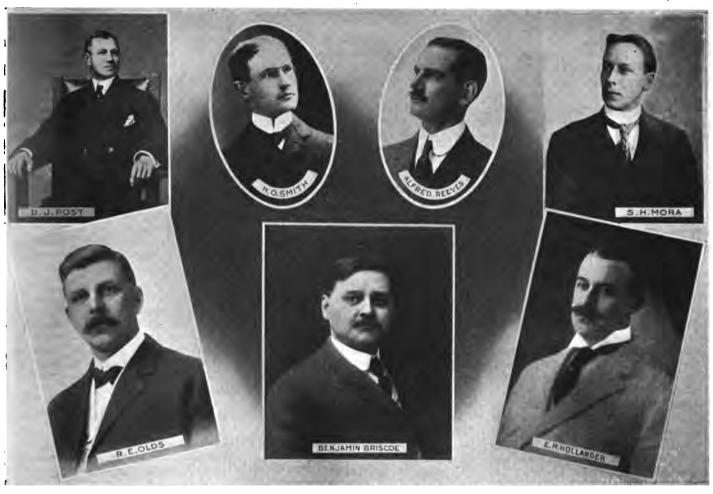
### SPECIAL NIGHTS.

As usual, the week will be made up of special nights, upon which various classes of people will attend. There will also be plenty of luncheons, dinners and meetings, the program for which is as follows: Friday, December 31, the usual private view of the show will be given to members of the Automobile Club of America, American Automobile Association, Long Island A C and city officials at 3 p. m. At 8 p. m. the formal opening to the public will useum.

Saturday, New Year's, the show will open at 9 a.m., and in the evening the Automobile Club will give a smoker to the exhibitors. This will also be "Army and Navy" night, and General Leonard A. Wood, commander of the Department of the East, and officers from Forts Schaylet. Wadsworth, Hamilton and Governor's Idand have been invited by the Army and



THE GRAND CENTRAL PALACE.



SHOW COMMITTEE OF THE AMERICAN MOTOR CAR MANUFACTURERS' ASSOCIATION.

Navy Club. Sunday will be observed as a day of rest, and visitors will have a good opportunity to see what the town looks like.

Monday, January 3, the New York Automobile Trade Association will hold its meeting at Hotel Manhattan at 12 noon. "Engineers' Night."

Tuesday, January 4, is "Society Day," with the admission fixed at \$1. This will be the only dollar day, the admission being 50 cents during the rest of the week. The Society of Automobile Engineers will hold its meeting at 10 a. m., and at 8 p. m. will hold its dinner at the Automobile Club of America.

Wednesday, January 5, the A. A. A. Good Roads Board will have a meeting, and at 6 p. m. the Motor and Accessory Manufacturers' annual meeting is scheduled, to be followed by a banquet at 7:30 at the Waldorf. The evening will be known as "Merchants' Night," and many prominent commercial men and merchants' associations will attend.

Thursday, January 6, at 3 p. m., will be the meeting of the committee of management of the A. M. C. M. A., and at 7 p. m. the dinner to dealers given by the Maxwell-Briscoe Motor Company at Hotel Manhattan. "New York Night."

Friday, January 7, there will take place at Hotel Manhattan the first annual meeting of the newly formed Manufacturers' Contest Association, which by that time will have taken charge of automobile contests in America. President Benj. Briscoe will preside.

### SOME ATTRACTIONS.

Of course, about every conceivable type of body on all sorts of chasses will be found in abundance at the Palace. The new "gunboat" bodies and "torpedo tonneaus" are expected in large numbers and in varied color schemes. A number of manufacturers who are more or less identified with racing will show racing stock cars and special speed machines, among them being the Fiat, Isotta, Renault, Lancia, Hotchkiss, Marmon, Chadwick, National, Stoddard-Dayton, Atlas, Maxwell and, perhaps, one or two others. It is expected that the chief racing attraction will be E. W. C. Arnold's famous 175 horse power Brooklands Fiat, with which Lewis Strang recently broke so many world's track records and American records at Atlanta, Ga., and Indianapolis, Ind. An examination of this high powered motor will prove most interesting to technical and lay men alike. The Renault which won a twenty-four hour race at Brighton last August, the Marmon Wheatley Hills Trophy winner and the Atlas Vanderbilt Cup car, that ingenious, musical, two cycle affair, will also be present.

No effort has been made to arrange the accessories, which occupy a good portion of the upper floors, into divisions. The Motor and Accessory Manufacturers' As-

sociation was allotted the bulk of the space, which they divided up among their members, who, of course, received preferred space. The unattached manufacturers got what was left. While a departmentization of accessories would be, no doubt, a desirable thing, such a condition is impossible, owing to the fact that many companies handle numerous lines of goods. Commercial vehicles have been centred as much as possible on the second floor.

### REDUCED FARES.

By an arrangement made by the A. A. A. with the Trunk Line Association it will be possible for many out of town visitors who are members of the Three As to make a trip to the show and home again at a reduced rate. A round trip can be procured from the territory mentioned below for one fare and three-fifths, and a large number will take advantage of the reduction. This holds good for all sections of New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, Virginia (points on the C. & O. and B. & O. roads), West Virginia, Ohio, Michigan (east of Lake Michigan), Indiana, Louisville, Ky., and St. Louis, Mo. Roads through Illinois will also make reductions for the numerous Chicagoans who will journey hither. The rate holds good between December 28 and Januarv II.

In commenting on the coming show, Alfred Reeves said a few days ago: "It has

been proven to manufacturers at the last two shows that the public has become educated as regards the motor car to a surprising degree. A dealer cannot stand in a booth nowadays and talk all sorts of foolishness about his car, arguing in circles, as he could a few years ago. Prospective purchasers and private owners who go to automobile shows now frequently know more about cars than the salesmen do. Where a manufacturer could expound the virtues of a certain form of construction to a prospective buyer a few seasons back, and convince the non-technical customer that it was something wonderful, when it was really poor, he cannot work that trick nowadays. Show the average private buyer something second rate at the show this year and he will turn around and tell you wherein it is lacking, and why. He has learned to judge a car in much the same manner that he would use his brains and common sense in judging a horse, picking thoroughbred instead of skate. It does a manufacturer no good in these days to tell all sorts of lies about his car, and make preposterous claims for what it will do, and it is pleasing to note that salesmen realize this. The motor loving public has 'gotten wise,' to use the classic phrase, and the men who sell cars at retail are the men who know their car and its construction well enough to give a prospective motorist a really intelligent argument. The interest that people are taking in automobile shows this year is remarkable. Not only will the A. M. C. M. A. show be the largest ever held, but the same holds true of all the larger shows all over the country-more exhibitors, bigger space, bigger attendance."

### IMPORTERS' SALON.

The Importers' Automobile Salon, in which nearly all of the foreign exhibitors are members, expects to make a splendid showing of handsome foreign cars, the bulk of which are high priced. At a meeting of the salon last week the various members when canvassed declared that all or most of their new models would arrive from Europe in time to be placed on exhibition, and the reports that the majority would be unable to show much of a line on account of delayed shipments seem unfounded. Some of these cars have come, or are coming, direct from the factories, and others from London, where they were exhibited at the Olympia Show. It is the intention of the importers to make their exhibit as comprehensive as possible, in view of the keen competition they are forced to fight in order to sell foreign cars in this country.

### COST OF SPACE.

That it costs exhibitors something to show their wares at these shows is evidenced by the fact that floor space on the main floor in the centre of the building sold at \$1.50 per square foot. The sides, back and front on this floor cost \$1.25 per square foot, and the first and second balconies \$1 and 75 cents, respectively. Signs and deco-

rations are furnished at 40 cents per foot of floor space.

In order that the show may present a pleasing and artistic aspect to visitors, the management will not permit the removal or receipt of goods in booths during the day with the exception of the hours 8 to 10 a, m. and 6 to 7 p. m. Another pleasing feature this year will be that no loud noises, such as the sounding of horns and sirens, or other devices which make unpleasant sounds, will be allowed. On account of fire department restrictions, no gasoline or other fuel will be allowed in tanks, and no acetylene lights will be permitted to burn. The latter will do away with much of the unpleasantness of bright lights flashing in people's eyes.

Those who expect to find radically new features in design will encounter disappointment. Charles E. Duryea, the association's technical expert, who has made numerous comparisons and gathered statistics of cars to be shown, says that the general tendency in design, save that of town cars, is toward longer wheel bases, lighter and shorter motors, wider doors and enclosed front seats. Magnetos are almost universal, while longer springs and larger wheels and tires will be noticed.

Some months ago, owing to the tremendous number of new manufacturers entering the field, with the announcement of about 200,000 cars for 1910, it looked as if there might be overproduction, and therefore a big drop in prices, but instead of a cut most of the makers of medium priced cars have raised the price of 1910 models anywhere from \$50 to \$250. Inability to secure enough parts from part makers and the increase in the price of tires and other material have made the raise necessary.

### Our Show Number.

The present issue is our first Grand Central Palace Show Number. It contains as special features a specification table, giving the specifications of all the different chassis types to be exhibited; photographs of one car of each make on exhibition; a collection of radiator outlines, which covers nearly every make, and a review of the parts exhibits.

In connection with the specification table, it may be pointed out that practically every make of runabout is furnished; also with either a single or double rumble seat, thus constituting a two, three or four passenger vehicle. Generally the three and four passenger cars sell at a slight increase in price over the two seated runabout. The table does not contain these alternative body models, as all the specifications outside the body and seating capacity are the same as for the two passenger car. It will be observed that the cars in the table are separated into gasoline pleasure, gasoline commercial and electric commercial cars, and in each division they are arranged in the order of price, which will be found particularly handy by intending purchasers.

The side views of cars include one of each make on exhibition, so far as we found it possible to insure completeness, and include mainly the leading and most recent types. The front views of radiators show that while the Mercedes form of outline is very prevalent, there is still considerable variety in radiator shapes.

An attempt has been made to classify the parts exhibits, but it is obviously impossible to carry this system of classification out completely, for the reason that some of the supply houses, for instance, exhibit a very large line, and would have to be enumerated under each head. For this reason supply dealers and jobbers carrying a line of considerable variety are classed by themselves. This method of classification under different heads will be found convenient to those looking for articles offered in particular lines. However, if they want to be sure to learn of everything in this line at the show, they will be obliged to read through the entire section on parts exhibits, as in some cases firms exhibiting two and three lines are classed under the heading covering their leading line, and their minor lines are mentioned at the same

### Milwaukee Dealers Boycott Show.

Representatives of twenty-five well known makes of automobiles in Milwaukee, Wis., have issued a public statement, announcing that they have mutually agreed not to display their cars in the second annual automobile and motor show of the Milwaukee Automobile Club, in the Auditorium, from February 22 to 27, inclusive.

"Believing the expense of exhibiting will be greater than the profits to be derived from the show," the announcement says, "we will not exhibit at this coming show." The agencies are:

Mitchell Automobile Company, Mitchell; Rambler Garage Company of Milwaukee, Rambler; Sanger Automobile Company. Oldsmobile, Maxwell, Stearns; Curtis Automobile Company, Reo; Jonas Automobile Company, Peerless and Cadillac; Welch Brothers Motor Car Company, Packard and Rauch & Lang electric; Akin Motor Car Company, Stevens-Duryea and Columbus electric; Emil Estberg, Pope-Hartford, Waverley and Woods electrics; Hickman, Lauson & Diener Company, Ford; Waite Brothers, Moline; Riverview Automobile Company, Moon; Bates-Odenbrett Auto Company, Overland, Marion, Winton; Albert Smith, Palmer & Singer; American Automobile Company, Pierce-Arrow, Apperson, Babcock electric

Each of the fourteen agnecies will conduct private shows in their respective garages. They claim unfair treatment from the Milwaukee Automobile Club, but the nature of this is not given out. President Clarke S. Drake, of the M. A. C., says that he is not aware of any unfair treatment, and while regretting the attitude of these dealers, believes the club will be able to get along without them.

### The Best Way to See an Automobile Show.

By H. H. Brown.

The question as to the best way to see an automobile show is a good deal like the often heard query regarding the best automobile; that is, there is no answer or there are a dozen, according to the viewpoint. In other words, it depends on what one wants to see and learn, as well as upon the time at one's disposal.

A good many ladies visit an automobile show chiefly to get a line on the different styles of dress, both for evening and automobile wear. To the ultra technical this seems somewhat frivolous, but as a matter of fact many dressmakers visit both automobile and horse shows simply with this object in view. Then, again, comfort in motoring, both in winter and summer, especially in the case of a woman, is quite largely dependent on suitable dress. Now that motoring has become an all the year round sport many people come by machine from quite long distances to visit the shows. As most of these are motorists of experience a less experienced person should easily be able to get many good ideas in styles by observing the visitors to the show. Perhaps the best time for this is late in the morning, as well as early in the afternoon. Of course for observing the styles in regular street and evening clothes the best time is the evening.

### HE NOVICE.

Perhaps the person most difficult to instruct how to see a show is the novice who has got his first touch of the fever. The chances are that he, if alone and unguided, will be in a sorry state of confusion when he leaves a show after his last visit thereto. The best thing for such a one to do is to get hold of some experienced and disinterested friend, state his case frankly, place himself in his friend's hands and ask him to serve as a guide.

It is, however, the motorists of experience to whom a show holds out the greatest interest, and this class may visit a show for a variety of reasons. They may wish to pick out a new car, to renew some article of equipment, such as horns, lamps, tires, ignition equipment, etc., on the old car, or perhaps simply to see with their own eyes the progress in the various branches of the industry and the general trend of design. There is also another possible object in attending a show which, while it may not be the leading motive, is yet worthy of mention.

Most of the leading manufacturers bring designers and factory men to a show, as well as their sales forces. Their object is to give them a chance to study various details of design in other makes of cars, as well as various features of equipment, which it may be desirable at some future time to incorporate in the design of their own car. Then, again, these practical men are often able to help out salesmen by talks

with customers on practical points which are beyond what can reasonably be expected of a salesman. Often the owner of a car has some little difficulty in its management which he has been unable to wholly overcome, and on which the local agent cannot enlighten him. In many cases a few minutes' conversation with the factory men enables him to overcome this difficulty in the future. The benefit from intercourse with technical men is by no means one sided. For some unknown reason defects in design will in many cases appear when a machine is placed in the hands of the general public which no amount of ingenious and studied abuse on the part of testers has been able to reveal. It often happens under these circumstances that some slight hint dropped by a user will put a designer on a line of thought which will eventually lead to the overcoming of the difficulty.

### MUST HAVE A PURPOSE.

In order to get the most out of a visit to the shows it is necessary to have some definite object in view. If one cannot think of any particular one the following suggestion may be of use: Start as soon as possible and think up some of the defects of design that have appeared in your car, or, if that is perfect, in the cars of your friends. Then in visiting the show, look to see what has been done to remedy these defects. It is probable that even if one does not follow out this course to a logical conclusion it may start one on a line of thought that will help one to better enjoy the show. Let us suppose that one has been troubled with water in the gasoline. This would lead one to look at strainers and separators on storage tanks and funnels, and also at filters placed between the tank and the carburetor, as well as at the design of carburetors themselves.

### TIRE NOVELTIES.

If there is one thing more than another that the average motorist is ignorant of it is tire manipulation. For this reason the kit of tire tools is usually inadequate and when the necessity arises for replacing a damaged inner tube, whether it be with a quick detachable or clincher rim, considerable difficulty is generally experienced.

This matter has been given considerable thought by both tire and accessory manufacturers, and each year brings out some new devices both in tools, appliances, tires and rims to mitigate the evil of the puncture fiend. There are probably few motorists who cannot profit by a little time spent in the examination of these appliances and their use. Examples might, of course, be multiplied indefinitely, but the two given will probably serve as well as any for an illustration.

Having now got our list of subjects in which we are interested, perhaps the next thing in order is to look over a list of exhibits and find the ones in which we are most likely to be interested. These lists are always published in the trade papers somewhat in advance of the principal shows. As a general thing the location of the exhibitors in the hall is also given, but in case it is not this can be obtained on the spot from the program issued by the show management. It is well, before visiting a show, to make some slight notes as to the exhibits that one especially wants to see, and also of any special features that one wants to look up.

### TOURS OF STUDY.

The more experienced a motorist is the more he can see for himself without the guidance of a salesman or exhibitor. For this class of show visitor the best time to see a show is what may be called the supper hours; that is, from about half past five to eight. During this time the small number of people in the building will give one easy access to most all of the exhibits. One can then look them over, make notes of any questions that he wants to ask, in case there are no persons in attendance at the particular exhibit capable of answering them, and later in the evening return and get information on the desired points. In case one is fortunate enough to be able to visit the show more than once, it is a good idea to collect as many catalogues as possible and read them over at home and look into the interesting points disclosed on the next visit. Various methods of carrying the catalogues collected can be resorted to. One that the author has found to be good is to wear a comparatively thin overcoat so as not to be inconvenienced by its warmth and to use the pockets of the same for receptacles, to contain the collection. Of course, if one has friends among the exhibitors this problem is then very simple, for as soon as the bulk of a collection becomes inconvenient for temporary transportation one can return to the friendly exhibitor's stand and deposit them in a safe place.

If one's time is limited it is much better to see the show by one's self than with a friend who has not seen it before.

Under these circumstances one can linger over the points at exhibits which interest him and pass over those which do not. If with a friend the chances of exactly the same points being of interest are rare, and one wastes time over what he is not interested in and perhaps hurries over what he really wants to see more thoroughly.

In the case of two friends of experience going to see a show together, a good plan is to so arrange matters that each of them sees a certain part of the show, then meet and briefly discuss what both have seen. Under these circumstances one is likely to see points which the other has overlooked.





























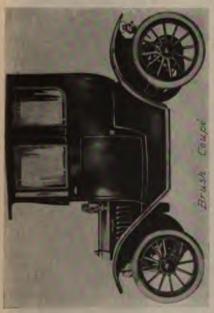


























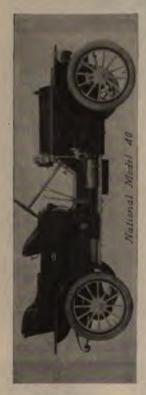




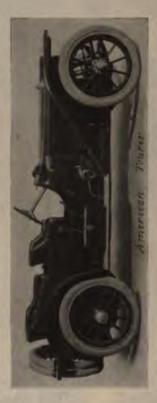




















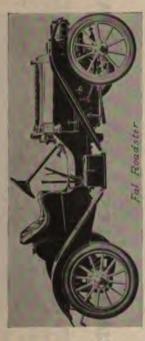


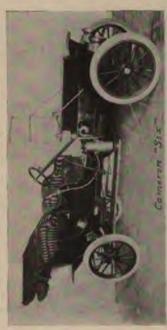


























McCure Torrero CAR.









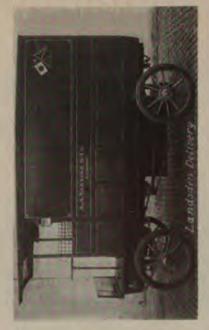


ELECTRIC COMMERCIAL VEHICLES EXHIBITED AT GRAND CENTRAL PALACE.

Trip Trip
Steering Gear, Worm, Worm, Worm,
Motor Equipment, Single, Single, Single,
Speeds, Speeds
Battery For Mileage. Sp 18 40 45
The Size. 6x24 89x8 89x8//
Speed Loaded, M. P. H.
Wheel Base. 120 88 81 121
Weight, 2,750 2,700 3,800
Loading Capacity, Pounds, 4,000 1,500 1,000 2,000
Type of Car. Truck, Delivery. Delivery. Express.
Price. \$1,750 2,450 2,650 3,130
Naker and Name of Car.  Lansden Co.—Lansden









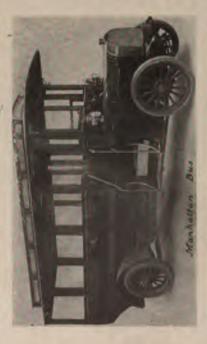














# SPECIFICATIONS OF GASOLINE PLEASURE CARS AT THE SHOW.

Maker and Name of Car.	Type of Car.	Seating	Cylin-	Bore 1	Horse	Weight	Wheel Tire	Cooline	Ismition	Intrinstita	7	Forward Gear	Stations Comments	Ė
		63	2 opp.			1,150 68	•	Air.	Battery.	Force feed.		2 planetary.		Chair
Brush Runabout CoBrush 485	5 Runabout.	t.	-	4x5	7	80	28x3	Thsiphon.	Battery.	Splash,	Mult. disc.	2 planetary.	Gear.	Chair
Reo Motor Car Co.—Reo 500	Runabout,	t.	1	4 1/2 x 6	10	78	3 28x8	Water.	Battery.	Gravity.	Mult. disc.	2 planetary.	Worm.	Chair
Demotcar Co.—Demot 550	) Runabout	t 23	63	3%x3%	10	800	30x8 %	Thsiphon.	Mag. battery.	Splash.	Mult. disc.	2 planetary.	:	Shafi
W. H. McIntyre CoMcIntyre 600	Runabout.	; 82	3 opp.	4%×4%	20 1,	1,200 Po		Water.	Batteries.	Force feed.	•	2 planetary.	Worm.	Shafi
Metz Plan Car CoMetz 600	Runabout.	0X	2 opp.	8 1/4 x 3 1/4	18	450 81	78x83	Air.	H. T. magneto.	Gravity.	:	Friction.	Gear.	Chair
Maxwell-Briscoe Motor CoMaxwell 600	0 Runabout.	t.	2 opp.	4×4	12 1,	1,100 82	28x3	Th. siphon.	Mag. battery.	:	Mult. disc.	2 planetary.	:	Shafi
		بر 20	•	31/4×346	20 1,	1,150 86	30x8	Th. siphon.	Mag. battery.	Splash.	Mult. disc.	2 selective.	Rack, pinion.	Shafi
		<b>4</b>	S opp.	4%×4%	18 1,	1,500 77	37x14	Air.	Battery.	Force feed.	:	2 planetary.	:	Chair
		≈ .	3 2-cycle.	3 1/x 4	25		82x3	Thsiphon.	Mag. baftery.	Force feed.	Cone.	2 semi-select.	:	Shaf
	Surrey.	<b>~</b>	S obb.	5%×4%	24 1,	1,400 103	34×8½	Water.	Battery.	Force feed.	:	2 planetary.	Worm, rack.	Chair
		œ.	-	3 1/4 × 8 1/5	24 1,	1,075 100	32x8	Air.	Mag. battery.	Force feed.	Cone.	8 selective.	Gear.	Shafi
		ο <b>ι</b>	-	8½×4	20 1,	1,550 96	88x8½	W. thsi.	Mag. battery.	Splash.	Cone.	2 selective.	Pinion.	Side
Co.—Middleby	Runabout.	 89	-	4×4	25 1,	1,950 108	32x8 ½	Air.	Batteries.	Force feed.	Cone.	8 progressive.	Worm.	Shafi
:		بر مهر	<b>+</b>	4×4				Water.	Mag. battery.	Splash.	:	Friction.	Worm.	Chair
:		•	8	4 1/8 x 4 2-cyc.	20 1,	1,500 100	40x136	Air.	Batteries.	Oil in gasoline.	:	2 planetary.	Screw, nut.	Chair
		t.	<b>+</b>	376×375	24 1,	1,300 104	30x3	Air.	Mag. battery.	Force feed.	Cone.	3 selective.	Gear.	Shafi
Ford Motor CoFord 950	Touring.	9	•	3½x4	20 1,	1,200 100	30x3-8½	1/2 Thsiphon.	Mag. battery.	Splash.	Mult. disc.	2 planetary.	Planetary.	Shafi
Black Mfg. Co.—Black Crow 1,000		99	•	8 16×4 1/5	25 1,	1,900 107	32x8%	Thsiphon.	Mag. battery.	Force feed.	Mult. disc.	8 selective.	Worm.	Shaft
Uakland Motor Car CoOakland 1,000		ند	•	4×4	30 1,	1,600 100	32x8%	Water.	Mag. battery.	Force feed.	Mult. disc.	3 selective.	Gear.	Shafi
Middleby Auto CoMiddleby 1,000		#	•	4×4	26 2,	2,100 108		Air.	Batteries.	Force feed.	Cone.	8 progressive.	Worm.	Shaft
Maxwell-Briscoe Motor CoMaxwell 1,000	Touring.	2	<b>-</b>	3½×4	. 23	98	80x3 ½	Thsiphon.	Mag. battery.	Splash,	Muit. disc.	3 selective.	:	Shafi
Mora Motor Car CoMora 1,050		t.	•	3¼x8%	20 1,	1,300 84	82x3	Thsiphon.	Mag. battery.	Circulating.	Expanding.	2 progressive.	Spiral.	Shaft
Mitchell Motor Car CoMitchell 1,100			+	4 ½ x 5	30	_	88×3½	Water.	Mag. battery.	Force feed.	Cone.	3 selective.	Worm.	Shafi
Cartercar Co.—Cartercar1,100		<b>.</b>	<b>+</b>	4×4	25 25,	2,000 100	32x3 1/2	Thsiphon.	Double system.	Circulating.	:	Friction.	Worm.	Chair
		cau. 4	•	4%x4%	85 1,	1,600 105		Water.	Mag. battery.	Splash.	:	Friction	Worm.	Chair
Reo Motor Car Co.—Reo 1,250		ю	<b>4</b>	4×4%	. 08		84x8 1/2	Water.	Mag. battery.	Circulating.	Mult. disc.	8 selective.	Gear.	Shafi
Middleby Auto Co.—Middleby 1,250		•	<b>-</b>	1×1		_		Air.	Batteries.	Force feed.	Cone.	3 progressive.	Worm.	Shafi
Cakland Motor Car Co.—Cakland 1,250		*	<b>-</b>	txt.		_		Water.	Mag. battery.	Force feed.	Mult. disc.	8 selective.	Gear.	Shafi
		•	<b>→</b> ·	3%x4%			••	•	Mag. battery.	Circulating.	Mult. disc.	3 selective.	Worm.	Shafi
		، به	<b>9</b>	8 12 x 3 14		_		•	Mag. battery.	Force feed.	Cone.	3 selective.	Gear.	Shafi
		ים	<b>→</b> ·	4%x4%		_		Water.	Mag. battery.	Splash,	Cone.	3 selective.	Worm.	Shafi
		ابت	•	ð ,				Thsiphon.	Mag. battery.	Splash.	Cone.	3 selective.	Screw, nut.	Shafi
Jackson Automobile Co.—Jackson 1,250	louring.	יי פי	•	4×4	e 6			Thsiphon.	Mag. battery.	Circulating.	Mult. disc.	8 selective.	Worm.	Sbafi
				****		011 001,		water.	Mag. battery.	Vacuum.	Cone.	8 selective.	Worm.	Shafi
Crawford Automobile Co.—Crawford 1.350	Touring	9 10		4%x0		9 900 110	84x3/2	Water.	Mag. battery.	Force feed.	Cone.	8 selective.	Worm.	Shaff
W. A. Patterson Co.—Patterson 1.400		14	٠ ٦	4×4	, e			The si W.	Mag. Dattery.	Culturaling.	Colle.	o selective.		Tan S
		'n	•	81/2×81/4	36 1.			Air.	Mag. battery.	Force feed.	Cone	8 selective	7 or 111.	Shafi
Moon Motor Car CoMoon 1,500		10	•	41/4x5	30			Water	Mag. hattery.	Circulating	Expanding	S selective	į	4.40
Cole Motor Car Co.—Cole "30" 1,500		10	<b>-</b>	4×4	30 8	_		Thsiphon.	Mag. battery.	Splash.	Cone.	3 selective,	Worm.	Shaf
	Touring.	40	•	4%×4%	30	110	84×4	Th. siphon,	Mag. battery.	Splash.	Mult. disc.	3 selective.	:	Shafi
Moline Automobile CoMoline 1,500		43	<b>4</b>	4x4%	30	110	84x8 15	Th. siphon.	Mag. battery.	Force feed.	Cone.	8 selective.	:	Shaf
Kissel Motor Car Co.—Kisselkar 1,500		ĸ	•	4%×4%	30	8,400 110	33×4	Centr. pump.	Mag. battery.	Force feed.	Cone.	8 selective.	Worm.	Shafi
Black Mfg. CoBlack Crow 1,500		40	<b>~</b>	4%x6 38	35-40 2,	2,300 120	36×4	Th. siphon.	Mag. battery.	Force feed.	Mult. disc.	3 sclective.	Worm.	Shaf
Grant Square Automobile CoHalladay. 1,500		ıc.	•	4×4	30	2,000 110	84x8%	Centr. pump.	H. T. magneto.	Circulating.	Mult. disc.	3 selective.	Worm.	Shafi
B. C. K. Motor Car Co. Kline 1,575		ro.	•	3%×4%				Centr. pump.	Mag. battery.	Circulating.	Cone.	3 selective,	Worm.	Shafi
Dayton		i÷.	•	374×415		_		Centr. pump.	Mag. battery.	Circulating.	Cone.	8 selective.	Worm, nut.	Shafi
:		» « پ		41,1x5	9			Water.	Mag. battery.	Force feed	Cone. Mult iller	8 selective		Shafi
Jackion Automobile to Jackion 1,600	Touring 0	-	•	6. 1×1.7	, <b>i</b>	2.400 110	82x4	Th. styllon.	Mag. battery	C reculating.	Muit. alse.	3 selective.	Worm.	Shafi



# SPECIFICATIONS OF GASOLINE PLEASURE CARS AT THE SHOW—Continued.

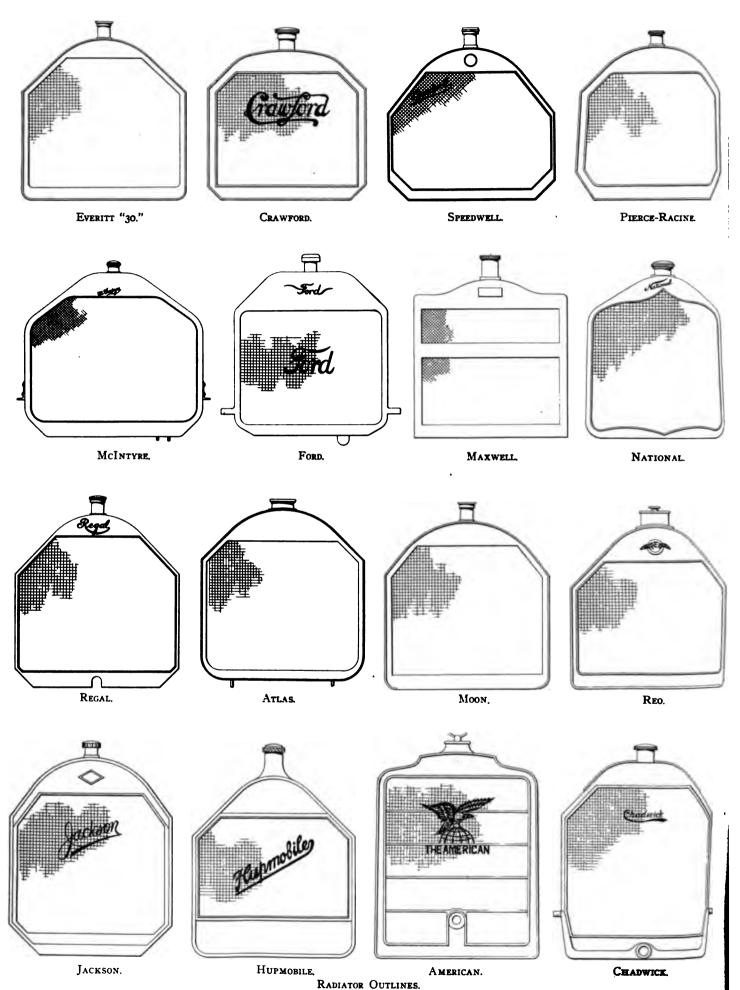
	Type of Car.	, ty	Cylin- ders.	)   <u></u>	Horse Power.	Weigh	Wheel		Cooling	Ignition.	Lubrication.	Clutch.	Forward Gear Changes.	Steering Gear.	Drive.
:		ıq.	•	4%x4%	80		110		Centr. pump.	Mag. Dattery.	Circulating.		r neuon.		Chain
Staver Carriage CoStaver 1,600		ю	7	4×4%	30	2,160	112	_	Centr. pump.	Mag. battery.	Circulating.	Mult. disc.	S selective.	Worth.	Shaft.
York Motor Car CoPullman 1,650	Touring.	ĸ	4	4×5	88	:	108	84×8½	Centr. pump.	Mag. battery.	Circulating.	Cone.	8 selective.	:	Shaft.
Oakland Motor Car Co Oakland 1,700	Touring.	10	•	€½×6	9	2,250	112	34×4	Water.	Mag. battery.	Splash.	Mult. disc.	8 selective.	Internal.	Shaft.
Buckeye Mfg. CoLambert 1,700	Touring.	10	•	4%×4%	32	1,900	116	34×4	Water.	Mag. battery.	Splash.	:	Friction.	Worm.	Chain.
Jackson Automobile CoJackson 1,700	Touring.	10	•	4%×4%	9	2,500	110	84×4	Thsiphon.	Mag. battery.	Circulating.	Mult. disc.	8 selective,	Worm.	Shaft.
F. A. L. Motor Co.—Falcar 1,750	Runabout.	04	•	4 1/2 x 5 1/2	<b>8</b> 2	2,300	116	84x8½4	Water.	Mag. battery.	Force feed.	Cone.	8 selective.	Worm.	Shaft.
Interstate Automobile CoInterstate 1,750	Touring.	2	•	4½×6	9	2,700	118	34×4	Water.	Double system.	Splash.	Mult. disc.	8 selective.	Worm.	Shaft.
F. A. L. Motor Co.—Falcar 1,750	Touring.	s.	4	4 1/2 x 6	9	:	116	84x8½-4	Water.	Mag. battery.	Force feed.	Cone.	S selective,	Worm.	Shaft.
Pierce Motor Co.—Pierce 80 1,750		ю	.*	4½x5	30	:	112	34×4	Centr. pump.	Mag. battery.	Circulating.	Mult. disc.	8 selective.	Wогт.	Shaft.
Velie Motor Vehicle CoVelie 1,800		ъ	•	4%×5%	07	:	115	84×4	Water.	Double system.	Splash.	Dry disc.	3 selective.	Worm.	Shaft.
Midland Motor Car CoMidland 1,800		-	•	4 1/2 x 5	9	2,000	115	34×4	Gear pump.	Mag. battery.	Circulating.	3 ring.	8 selective.	Worm.	Shaft.
	-	10	<b>4</b>	4%×4%	9	2,400	115		Thsiphon.	Mag. battery.	Circulating.	3 plate.	3 selective.	Screw.	Shaft.
		9	<b>+</b>	4%×4%	38	:	112	34×4	Water.	Mag. battery.	Circulating.	Cone.	3 selective.	:	Shaft.
		22	*	4 16×4 16	90	2,900	120	86×3½-4	Centr. pump.	Mag. battery.	Force feed.	Cone.	8 selective.	Worm.	Shaft.
Mitchell Motor Car CoMitchell 2,000		4	•	4 ½ x5	9	:	130	86x4	Water.	Mag. battery.	Force feed.	Cone.	8 selective.	Worm.	Shaft.
=		ø	7	4 8-16x5	<b>9</b>	2,740	116	34×4	Centr. pump.	Mag. battery.	Circulating.	Cone.	8 selective.	Worm, nut.	Shaft.
	-	50	3 2-cycle.	45×45	30	2,600	110	34×4	Centr. pump.	Atwater Kent	Force feed.	Expanding.	8 selective.	Screw, nut.	:
	_	:	. 🕶	8×4×6	11	:	109%	82x4	Centr. pump.	H. T. magneto.	Circulating.	3 disc.	8 selective.	Worm.	Shaft.
		10	4	434 x5 1/4	20	2,600	118	36x4	Gear pump.	Mag. battery.	Circulating.	8 ring.	8 selective.	Worm.	Shaft,
		7	•	4 1/x 4 1/2	90	2,800	120	86x4	Thsiphon.	Mag. battery.	Circulating.	Mult. disc.	8 selective.	Worm.	Shaft.
			2 2-cyc.	41/2×41/2	20	2,600	102	80x4	Centr. pump.	Atwater Ker.t	Force feed.	Expanding.	8 selective.	Screw, nut.	Shaft.
			•		9	:	123		Water.	Mag. battery.	Circulating.	Cone.	8 selective.	Nut.	Shaft.
		7	•	4 ½ x6	9	2,750	123		Centr. pump.	Double system.	Circulating.	Mult. disc.	8 selective.	Screw, nut.	Shaft.
		40	•	4%×4%	30	2,300	110		Centr. pump.	Dual system.	Force feed.	Cone.	3 selective.	:	Shaft.
		ptional.	•	4 1/2 x 5	35	2,500	117		Water.	H. T. magneto.	Circulating.	Cone.	8 selective.	Worm.	Shaft.
		. <del>.</del>	<b>-</b>	474×474	20	3,200	124	_	Centr. pump.	Mag. battery.	Force feed.	Cone.	3 selective.	Worm.	Shaft.
		ptional.	-		18-14	1,800	108 8	mm.	Thsiphon.	H. T. magneto.	Circulating.	Cone.	3 progressive.	Worm.	Shaft.
			ø	4×4%	45	2,460	184	36x4	Water.	Mag. battery.	Circulating.	Mult. disc.	3 selective.	Worm.	Shaft.
		•	•	25/5×4	10	:	107	80x31/2	Centr. pump.	H. T. magneto.	Circulating.	3 disc.	3 selective.	Worm.	Shaft.
	•	2	9	1-16x5	90	2,750	122	86x4 (	Centr. pump.	Mag. battery.	Circulating.	Cone.	3 selective.	Worm.	Shaft.
		9	<b>~</b>	4 1/2 x 5 1/2	07	:	120	84x4	Water.	M. & BMg. bt.	Force feed.	Mult. disc.	3 selective.	:	Shaft.
National Motor Vehicle CoNational 2,500		10	•	5x5 11-16	<b>\$</b>	2.850	124	86x4	Water.	Double system.	Force feed.	Cone.	3 selective.	Worm.	Shaft.
Mora Motor Car CoMora 2,500	Tourer.	10	•	41/2×51/6	<b>\$</b>	2,500	112	84x4	Water.	Double system.	Circulating.	Cone.	8 selective.	Bevel gear.	Shaft.
Atlas Motor Car Co\tas 2,500	Touring.	5 or 7 4	2-cyc.	5×5	90	2,900	128	·	Centr. pump.	Atwater Kent	Force feed.	Expanding.	3 selective.	Screw, nut.	Shaft.
Speedwell Motor Car CoSpeedwell 2,650	Sp'c'l torp'de.	• •	4	5x5	90	8,000	121		Centr. pump.	Dual system.	Circulating.	Cone.	8 selective.	Worm.	Shaft.
	Touring.	ьc	<b>~</b>		83	2,300	116	34×4	Water.	Mag. battery.	Force feed.	Cone.	3 selective.	Worm, nut.	Shaft.
Renault FrèresRenault 2,750		10	8	2½x4½ F.	F. rat'g 12	:			Thsiphon.	Magneto.	Splash.	Inverted cone.	3 progressive.	Могт.	Shaft.
Isotta Import Co.—Isotta 2,750	Voiturette.	œ	•	65x100 mm. 10-14	0-14	1,450	z	mm.	Centr. pump.	H. T. magneto.	Force feed.	Mult. disc.	4 selective.	::::	Shaft.
Delahaye Import Co.—Delahaye 2,750	Landaulet.	•	C1	92×110 mm.	14-16	3,200	105		Gear pump.	II. T. magneto.	Force feed.	Cone.	8 progressive.	Worm.	Shaft.
Dayton Motor Car CoStoddard-Dayton 2,800	-	•	•	4½x5	20	:	120	_	Centr. pump.	Double system.	Circulating.	Cone.	3 selective.	Worm, nut.	Shaft.
Bartholomew Co.—Glide 2,800	Touring.	2	4	4%×5	20	3,000	120	34×4-4½	Centr. pump.	Double system.	Circulating.	Mult. disc.	3 selective.	Bevel gear.	Shaft.
Hotchkiss Import Co.—Hotchkiss 2,850	Chassis only	:	•	3½×4%	15	2,200	109½ 81	810×90 mm.	Centr. pump.	H. T. magneto.	Force feed.	Cone.	3 selective.	:	Shaft.
Coates-Goshen Co.—Coates 2,925	Toy tonneau.	¥ ;	+	4½x5	38	2,800	116	36×4	Water.	Mag. battery.	Splash.	Cone.	8 selective.	Screw.	Shaft.
Moon Motor Car CoMoon 3,000		7	<b>-</b>	4%×5	45	3,000	120		Water.	H. T. magneto.	Force feed.	Mult. disc.	4 selective.	:	Shaft.
Hol-Tan Co.—Lancia	To order.	:	<b>-</b>	3.5×3.9	12-18	1,800	110 82	810x100 mm. 820x120 mm.	Water.	H. T. magneto.	Mechanical.	Mult. disc.	4 selective.	Worm.	Shaft.
	Tov tonneau.	5.	•	4 3/x5 1/4	36	3,000	114		Gear pump.	Dual system.	Force feed.	Cone.	8 selective.	:	Shaft.
Kiesel Motor Car Co-Kisselkar 8.000			æ	1%×1%	8	3,500	132		Centr. pump.	Max. battery.	Force feed.	Cone.	3 selective.	Worm.	Shaft.
Sultan Motor Co.—Sultan 3,000		æ	-		12-15	2,450	97		Thsiphon.	H. T. magneto.	Force feed.	Cone.	8 selective.	Worm.	Shaft.
York Motor Car CoPullman 8,000		က	•	6x6%	9	:	112	36×4	Centr. pump.	Pouble system.	Circulating.	Cone.	3 stlective.	:	Shaft.

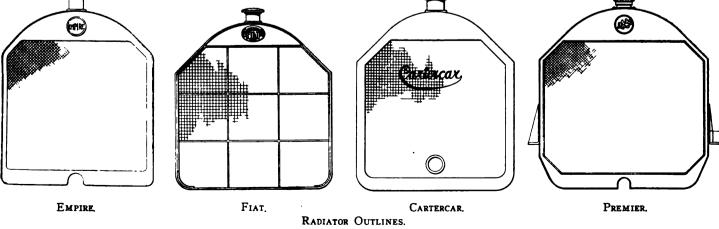
# SPECIFICATIONS OF GASOLINE PLEASURE CARS AT THE SHOW—Continued.

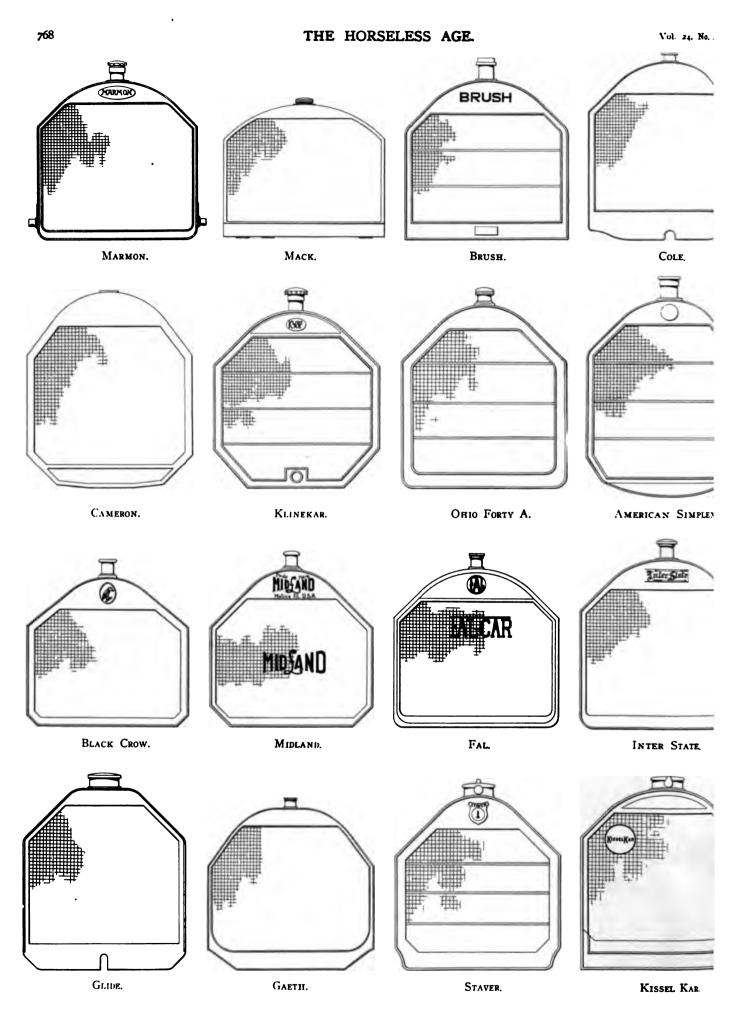
Maker and Name of Car.  Brewster & Co.—Delaunay 3,860	Type of Car.	Seating Capacity.	ity. de	Cylin- Bore ders. and Stroke.	Horse Power. m. 10		W} ght. Ba . 123	Wheel Tire Weight. Base. Size.	Cooling. Centr. pump.	Ignition. H. T. magneto.	Lubrication. Circulating.	Clutch.	Forward Gear Changes, S progressive.	Steering Gear. Worm, nut.	Drive.
	0 Runabout.	out. 4	_	%9x9 1	46	3,000	0 123	36×4 55	Water.	Mag. battery.	Splash.	Cone.	3 selective.	Screw.	Shaft,
C. G. V. Import Co.—Charron 8,250		Optional. Optional.	nal.	8x5	16-20	1,500	0 118		Th. siphon.	II. T. magneto.	Circulating.	Cone.	4 selective.	Worm.	Shaft.
Hol-Tan Co.—Lancia	0 To order.	kr. ::	Ť	8.7×4.3	20	1,800	0 115	880x100 mm.	Water.	H. T. magneto.	Mechanical.	Mult. disc.	4 selective.	Worm.	Shaft.
Crawford Automobile CoCrawford 3,500	0 Touring.		vo	6 6x6 y	9	3,400	0 135		Water.	Mag. battery.	Circulating.	Mult. disc.	4 selective.	:	Shaft.
Brewster & CoDelaunay 8,500	0 Chassis.	. :		98x122 mm.	am. 15	:	. 123	880×120 mm.	Centr. pump.	H. T. magneto.	Circulating.	Cone.	4 progressive.	Worm, nut.	Shaft.
Sidney B. Bowman,-Clement-Bayard 8,500	0 Landaulet.	ulet. 5	•	1 80x120 mm.	nm. 18	2,700	0 110	810x90 mm.	Water.	II. T. magneto.	Force feed.	Cone.	8 selective.	:	Shaft.
Premier Motor Mfg. CoPremier 3,500	0 Touring.		5 or 7	6 4½x5¼	Ş	:	. 189%	½ 86x4—5	Water.	M. & BMg. bt.	Force feed.	Mult. disc.	3 selective.	:	Shaft.
Fiat Automobile Co.—Fiat 8,500	0 Limousine.		5 or 7	4 80x100 mm.	nm. 18		. 107	810x90 mm.	Water.	Magneto.	Force feed.	Mult. disc.	4 selective.	Worm.	Shaft.
Mora Motor Car CoMora 3,500	0 Limousine.	sine.		4 4½x6¼	<b>ç</b>	8,800	0 112		Water.	Double system.	Circulating.	Cone.	3 selective.	Bevel gear.	
Hol-Tan Co.—Lancia8,500	0 Kunabout.		<b>0</b> 1	4 3.7×4.8	8	2,100	00 106	) 810×100 mm.	Water.	II. T. magneto.	Mechanical.	Mult. disc.	4 selective.	Worm.	Shaft.
De Dion-Bouton De Dion 8,500		Chassis only .		4x6 14	55 153	:	. 122 1/3	% 84x4%	Centr. pump.	H. T. magneto.	Circulating.	8 disc.	4 selective.	Worm.	Shaft.
Gaeth Automobile CoGaeth 3,500		39 1		4 476×614	42	8,800	0 120	86x4-4%	Thsiphon.	Make and break.	Force feed.	Contracting.	8 selective.	Screw, nut.	Shaft.
Pennsylvania Auto Motor CoPennsyl. 3,500	0 Touring.			4 4½×5½	88	8,800	0 123	86×4-4%	Gear pump.	Dual system.	Force feed.	Cone.	8 selective.	:	Shaft.
Hotchkiss Import Co.—Hotchkiss 8,650	0 Chassis.	. <u>s</u>		4 8¼×4¼	88	8,500	0 119	875×105 mm.	Centr. pump.	H. T. magneto.	Force feed.	Cone.	4 selective.	:	Shaft.
yton		isine.	_	4 4¾x5	20		0 128	86×4½	Centr. pump.	Double system.	Circulating.	Cone.	8 selective.	Worm, nut.	Shaft.
American Motor Car CoAmerican 4,000		ler.		4 634x65	8				Centr. pump.	Dual system.	Circulating.	Cone.	4 selective.	Worm.	Shaft.
Motor Car CoAmeri'n Simplex	•		~	4 6x6					Centr. pump.	Mag. battery.	Force feed.	Mult. disc.	3 sclective.	Worm.	Shaft.
		ulet.	<u>د</u>	4 88x120 mm.					Water.	H. T. magneto.	Force feed.	Mult. disc.	4 selective.	:	Shaft.
ent Bayard		.80	~	4 100×120 mm.	. 80-80	3,000			Water.	H. T. magneto.	Force feed.	Mult. disc.	4 selective.	:	Shaft.
Co.—Delaunay	_	is.	•	8 72×105 mm.					Centr. pump.	II. T. magneto.	Circulating.	Cone.	4 progressive.	:	Shaft.
ent-Bayard		ng.	_	80x120 mm.		3,500		<u> </u>	Water.	Mag. battery.	Force feed.	Mult. disc.	4 selective.	:	Shaft.
				4 44x5%	9				Centr. pump.	H. T. magneto.	Circulating.	3 disc.	4 selective.	Worm.	Shaft.
Allen-Kingston CoAllen-Kingston 4,500			Optional.	4 5%×6%		3,800			Water.	II. T. magneto.	Circulating.	Mult. disc.	4 selective.	Worm.	Shaft,
		tte.	_	1 90x120 mm.	7				Centr. pump.	H. T. magneto.	Force feed.	Mult. disc.	4 selective.	:	Shaft,
otchkiss		iş.		4 4½×5½		8,000			Centr. pump.	H. T. magneto.	Force feed.	Cone.	4 selective.	:	Shaft.
		ısine.		6 90×120 mm.	m. 18				Water.	Magneto.	Force feed.	Mult. disc.	4 selective.	Worm.	Shaft.
ent-Bayard		ng.		4 120x140 mm.		8,500			Water.	Mag. battery.	Force feed.	Mult. disc.	4 selective.	:	Shaft.
Brewster & Co.—Delaunay 5,100		.: :	•	s 98×122 mm.					Centr. pump.	H. T. magneto.	Circulating.	Cone.	4 progressive.	Worm.	Shaft.
Sidney B. Bowman,-Clement-Bayard 5,500	0 Touring.	ng. 1	_	140×140 mm.	н. 60	3,750	0 130	6	Water.	Mag. battery.	Force feed.	Mult. disc.	4 selective.	:	Shaft.
Chadwick Engineering WorksChadwick 5,500	O Touring.		~	6 5x6	8	3,450	0 130	86x4, f. ( 87x5, r. (	Water.	Double system.	Force feed.	Expanding.	4 semi-select.	Screw.	Double chain,
Fist Automobile Co.—Fist 5,500		:		110x130 mm.	m. 25	:	. 120	800x120 mm.	Water.	Magneto.	Force feed.	Mult. disc.	4 selective.	Worm.	Shaft.
De Dion-Bouton, De Dion 5,500		Chassis only .		8 8%×1%	20	:	. 180%	% 86х5%	Centr. pump.	H. T. magneto.	Circulating.	Cone.	4 selective.	:	Shaft.
Isotta Import Co.—Isotta 5,600	O Chassis.	.: :		180×150 mm.	40-45	2,460	0 124	875×105 mm., f. 985×185 mm., r.	Centr. pump.	II. T. magneto.	Force feed.	Mult. disc.	4 selective.	:	Shaft.
Renault Frères Selling BranchRenault 5,800	O Touring.	, i	_	4 4%x6%	25-35		0 128	36x4_4%	Thsiphon.	II. T. magneto.	Automatic.	Cone.	4 progressive.	:	Shaft.
Figt Automobile Co.—Figt 6,000		:	•	4 180×140 mm.	m. 45	:	. 126	920x180 mm.	Water.	Magneto.	Force feed.	Mult. disc.	4 selective.	Worm.	Shaft.
Chadwick Engineering Works.—Chadwick 6,500		out.	~	6 5×6	90	8,000	0 118		Water.	Double system.	Force feed.	Expanding.	4 semi-select.	Screw.	Double chain,
Saotta Import Co.—Isotta 6,500	0 Touring.			110x180 mm.	. 30	8,150	0 120	870x90 mm., f. 880x120 mm., r.	Centr. pump.	H. T. magneto.	Force feed.	Mult. disc.	4 selective.	:	Shaft.
Hotehids Import Co.—Hotchkiss 6,500	O Chassis.			6 4½x6%	55	3,500	0 14814	14 920x120 mm.	Centr. pump.	H. T. magneto.	Force feed.	Cone.	4 selective.	:	Shaft.
Panhard & LevassorPanhard 6,500	-	Toy tonneau. 5		3 90x180 mm.	m. 35			880×180 mm.	Water.	H. T. magneto.	Splash.	Mult. disc.	4 progressive.	Worm,	Chain.
				110x180 mm.	n. 46		. 130	980×180 mm.	Water.	Magneto.	Force feed.	Mult. disc.	4 selective.	Worm,	Shaft.
De Dion-Bouton De Dion. 7,500		s only .		8 43Kx55	100	:	. 180%	% 86x5%	Centr. pump.	H. T. magneto.	Circulating.	8 disc.	4 selective.	Worm.	Shaft.
•-				6 4Xx6X	2	:		<b>2</b> 2	Centr. pump.	H. T. magneto.	Force feed.	Cone.	4 selective.	:	Shaft.
Columbus Buggy Co	. Touring.	aj.	_	4×4	2	:	100	88×8%	Thslpbon.	Mag. battery.	Circulating.	Conc.	8 selective.	:	Shaft.

### GASOLINE COMMERCIAL VEHICLES.

Chase Motor Truck Co.—Chase	. 500 . 1,000 . 1,000 . 1,000	ders.	and Stroke, Fo 4½x42-cyc.	Fower. Weight. 12 1,500	ight. Base.	sc. Tire Size. 87x15%, f. 8 40x15%, r.	Cooling. Air.	Ignition. Battery.	Lub <b>ricat</b> ion. Oil <b>in ga</b> soline.	Clutch.	Gear Changes. 2 planetary.	Drive. Chain.
		∞ .					Air.	Battery.	Oil in gasoline.	:	2 planetary.	Chain.
		•										
		<b>2</b> 0		15 1,4	1,450 100	97x1¾, f. 40x1¾, r.	Air.	Battery.	Oil in gasoline.	:	2 planetary.	Chain.
		23	4½×4½	14 1,8	1,800 88		Water.	Mag. battery.	Force feed.	2 planetary.	Bevel.	Chain.
		8	4 ½ x5	18 2,4	2,450 92	3 86x2½, solid.	Water.	Mag. battery.	Force feed.	2 planetary.	Bevel.	Chain,
		•	1×1	25 2,200	00 120	34x8, solid.	Water.	Mag. battery.	Circulating.	Multi. disc.	2 sliding gear.	Chain.
		<b>~</b>	256×4	10	111		Centr. pump.	H. T. magneto.	Circulating.	3 disc.	8 selective.	Shaft.
	1s. 2,000	2 opp.	5 1/2 x 5	30 4,000	00 102		Thsiphon.	:	Force feed.	:	2 planetary.	Chain.
	3,000	61	5 1/8 x8	30	120	82x31/2 82x3, dual.	Water.	Mag. battery.	Force feed.	Multi. disc.	3 selective.	Chain.
	3,000	•	256×4	10	180		Centr. pump.	H. T. magneto.	Circulating.	8 disc.	3 selective.	Shaft.
	4,000	2 opp.	51/2×5	30 4,000	00 127	82x4, f. 84x5, r.	Th. siphon.	:::::::::::::::::::::::::::::::::::::::	Force feed.	:	2 planetary.	Chain.
American Motor Truck CoAmerican 8,250 Truck.	₹,000	7	4½x5½	04	114		Centr. pump.	Double system.	Force feed.	Cone.	3 selective.	Chain.
Grabowsky Power Wagon CoGrabowsky. 3,500 Truck.	6,000	2 d. o.	6×6	40 4,500	00 127	84x4, f 86x81/5, dual.	Thsiphon.	:	Force feed.	. •	2 planetary.	Chain.
Gramm-Logan Motor Car Co 3,500 Truck.	6,000	-	4%x6	45 5,000	00 120		Centr. pump.	Mag. battery.	Circulating.	Multi. disc.	8 selective.	Chain.
Reliance Motor Truck CoReliance 3,500 Truck.	7,000	•	51/6×8	<b>45</b>	138		Water.	Mag. battery.	Force feed.	Multi. disc.	8 selective.	Chain.
De Dion-BoutonDe Dion 4,250 Truck.	6,000	•	814×414	18	146		Centr. pump.	H. T. magneto.	Circulating.	3 disc.	3 selective.	Shaft.
Mack Brothers Motor Car Co 4,859 Truck.	6,000	4	6 1/2 x 6	50 7,300	00 129	86x5, f. 86x3½, dual.	Centr. pump.	Mag. battery.	Force feed.	Cone.	8 selective.	Chain.
Reliance Motor Truck Co.—Reliance 4,400 Truck.	10,000	•	5 1/4 x8	: 00	138		Water.	Mag. battery.	Force feed.	Multi. disc.	3 selective.	Chain.
American Motor Truck Co.—American 5,000 Truck.	10,000	<b>~</b>	51/4x6	60 8,800	00 113	86x7, f. 86x5, dual r.	Centr. pump.	Double system.	Circulating.	:	2 planetary.	Chain.
Albert T. OttoLaurer 5,000 Truck.	R,000	4	41/x51/	86 6,000	00 153	86x5, solid f. 42x5, dual solid r. Water.	r. Water.	II. T. magneto.	Force feed.	Multi. disc.	4 selective.	Chain.
Mack Brothers Motor Car Co 5,050 Truck.	10,000	•	5 1/2 x 8	49 8,200	00 126	86x6, f. 36x5, dual r.	Centr. pump.	Mag. battery.	Force feed.	Cone.	3 selective.	Chain.
Mack Brothers Motor Car Co 5,500 Depot bus.	18. 18 pass.	*	5 1/2 x 8	50 7.400	00 154	86x5, f. 86x4, dual r.	Centr. pump.	Mag. hattery.	Force feed.	Cone.	8 selective.	Chain.
Rapid Motor Vehicle Co.—Rapid 1. I.jeht truck.	1ck. 3,000	2 opp.	51/4×5	82	111	82×4, f. 84×4, r.	Water.	Battery.	Force feed.	:	2 planetary.	Chain.
Rapid Motor Vehicle CoRapid Florist.	2,000	2 opp.	5x5	24	06		Water.	Battery.	Force feed.	:	2 planetary.	Chain.
Rapid Motor Vehicle CoRapid \mbulance	ادد	2 opp.	5×5	+8	100		Water.	Battery.	Force feed.	:	2 planetary.	Chain.
Rapid Motor Vehicle Co.—Rapid Truck.	6,000	<b>+</b>	. 44/x51/	45 6,000	00 138	86x5, f. 86x3½, dual.	Centr. pump.	Double system.	Force feed.	Multi. disc.	3 selective.	Chain.
Rapid Motor Vehicle Co.—Rapid Truck.	10,000	<b>~</b>	51/x61/2	60 7,500	00 160	36x6, f. 36x4, dual.	Centr. pump.	Double system.	Force feed.	Multi. disc.	3 selective.	Chain.
Randolph Motor (ar Co.—Randolph 1)clivery	. 2,000	84	44x54	20 2,750	50 100		Thsiphon.	Double system.	Force feed.	Band.	3 selective.	Chain.
Randolph Motor Car CoRandolph Truck.	4,000	4	4 1/2 x 5	80 4,200	00 116	36x4, f. 36x5, r.	Gear pump.	Double system.	Force feed.	Band.	8 selective.	Chain.
Randolph Motor Car Co.—Randolph Truck.	6,000	•	4 1/2 x 5 1/2	36 5,700	00 183	86x8, f. 86x4, dual r.	Gear pump.	Double system.	Force feed.	Band.	3 selective.	Chain.
Randolph Motor Car Co. · Randolph Truck.	10,000	•	5×6	45 8,500	00 150	38x6, f. 40x5, dual r.	Gear pump.	Double system.	Force feed.	Band.	3 selective.	Chain.
Hart-Kraft Motor Co Delivery	1,000	2 opp.	4 ½ x 4	25.	:		Water.	Mag. battery.	Compression.	Multi. disc.	2 planetary.	Chain.







RADIATOR OUTLINES.

### Parts Exhibits at Grand Central Palace.

### Tires and Tire Sundries.

The Diamond Rubber Company, of Akron, Ohio, will display a full line of Diamond wrapped tread tires, which will be classified into types and treads. The types include regular clincher, regular quick detachable, mechanical (Dunlop type and Fisk bolted on); the treads include regular round Bailey and Diamond grip (anti-skid). In the treads the Diamond grip is being specially featured for this season of the year. Another feature of special interest will be the new demountable rim. Besides the



DIAMOND STEERING WHEEL.

complete line of automobile tires there will be shown the Diamond motorcycle tire and the Diamond motor buggy special tire, made for high wheel automobile service, and the Diamond motor truck tire. The knives and tools used by the natives in gathering the raw rubber will be shown, together with the Kimball Trophy Cup, won by Diamond tires in the Reliability Contest of the Chicago Motor Club.

There will also be shown a number of hard rubber specialties, including the steering wheel illustrated herewith.

The Firestone Tire and Rubber Company, of Akron, Ohio, will show their regular line of pneumatic tires, including round tread and Firestone anti-skid, with extra thick tread for winter use, together with the Firestone demountable rim, for both pleasure and commercial vehicles. The demountable rim for pleasure cars will take any quick detachable tire or any standard clincher tire, though the stiff back quick detachable tires are the only ones recommended by the Firestone Company, as they remain in place on the rim, whether inflated or not. A new feature of this rim is a sleeve on the valve stem by means of which tires may be changed right on the wheel without reference to the demountable feature. The felloe band will take either a quick detachable or regular clincher rim, and the one may be substituted for the other if it is desired without altering the wheel. A new demountable, for both dual and single forms of the standard side wire truck tires for commercial use, will be shown. Another feature of the Firestone booth will be the dual pneumatic equipment, consisting of a pair of tires mounted on a demountable rim for rear wheel use.

The Goodyear Tire and Rubber Company. Akron, Ohio, will show as a special feature the Goodyear-Doolittle demountable, detachable rim, which has heretofore been marketed by the Doolittle Rim Company. This rim, as the name implies, is both detachable and demountable. The tire can be taken off the rim itself in practically the same time the rim can be demounted from the wheel. In connection with the above will be shown the regular line of tires, including detachable tires in plain, Bailey block and Heavy Tourist treads, and clincher tires in the same styles of treads; the Goodyear long distance electric tire, the hard rubber base motor truck tire, the motorcycle tire, the Goodyear universal rim, the Goodyear air bottle, with new reducing valve, which prevents overinflation of tires on which it is used, and a complete line of rubber tire sundries, including Protection patches, inside tire protectors, rim cut patches, inner tube patches, cements and raw stocks for repair men.

The Pennsylvania Rubber Company, of Jeannette, Pa., will show their line of regular type wrapped tread and flat tread clincher tires, non-skid tires with leather tread and case hardened rivets. A new tire, which will be shown for the first time, is the new Pennsylvania suction cup tread. This tread consists of a series of rubber cup shaped knobs on the tread of the tire. The hollow cups are claimed to create a suction, and to prevent slipping on wet or icy surfaces. Another novelty will be a pair of aeroplanes mounted complete on 20x4 inch wheels. The wide tires are used to withstand the shock of a thousand pound machine alighting. They are practically of no greater weight than 21/2 or 3 inch tires of 28 inch diameter.

The Leather Tire Goods Company, of Niagara Falls, N. Y., will have on exhibition their line of Woodworth treads, their new Woodworth tire chain, the Woodworth repair boots and the inside shoe patches. Two styles of treads are to be shown, the adjustable tread and the improved self adjusting tread. The adjustable tread has the crimped wires on each side, with the strap and buckle adjustment. The Improved Self Adjusting tread, which is a new design, is held on the tire by a chain work on each side composed of alternate coil springs and galvanized steel rings, which are riveted to the edge of the leather of the tread. The Woodworth tire chain differs from others in having strips of heavy leather under the cross chains to protect the tires.

The Gilbert Manufacturing Company, New Haven, Conn., will display a complete line of tire cases, spare tire brackets, carburetors, brass, leather and rubber specialties, principal among which will be the Gilbert tire case, made of black enameled duck, which has the edges bound with leatherette and fitted with extra large substantial snap buttons. With every case is furnished an extra bag which may be used for carrying a spare inner tube when the case is in use on the tire. A line of magneto covers, crank handle holders, steering knuckle end and universal joint boots made from leather will also be shown. Tire brackets made in all sizes will also be shown

The Federal Rubber Company, Milwaukee, Wis., will show a new anti-skid tire, which is known as "Federal's Cross Country Type." This is a most heavily constructed tire, and is recommended for heavy limousine cars and for winter usage. A mileage of 10,000 is claimed for this type, and it is considerably higher in price than other tires, owing to the fact that it has a specially treated, very tough tread. This same tread is used on the anti-skid tires as well as in the plain wrapped type.

American Stepney Spare Wheel Company, 1773 Broadway, New York, will have on exhibition their line of demountable rims and tires. These rims are applicable to either front or rear, and can be carried on the steps, requiring no more room than an extra tire casing; nor is it necessary to alter the automobile wheel in order to apply or to remove the injured tire. Demon-



STEPNEY BEING ATTACHED

strations will be given showing how to attach and detach the rims in case of trouble.

The Hartford Rubber Works Company, of Hartford, Conn., will show Hartford-Dunlop clincher and quick detachable clincher tires; Hartford wire grip, non-skid tires; Hartford aero tires and Hartford aero varnish. The Hartford clincher motorcycle tire and a double clincher tire with a special tread will be shown for the first time, and with the non-skid automobile tire will be especially featured. In connection with the above will be shown a full line of accessories, which include auto bumpers, horn bulbs, bow top separators, acetylene gas tubing, pumps, repair kits, shoe liners, Healacut cement, patches, Rough Rider grips for motorcycles and solid motor tires

for commercial vehicles. Also a crude rubber biscuit, washed rubber compound and the fabric which enters into the construction of the tires.

Morgan & Wright, Detroit, Mich., will display their full line of clincher, Dunlop and quick detachable clincher tires, side wire solid tires, hard rubber battery jars, motorcycle tires, auto sundries, etc. The feature of their exhibit this



MORGAN & WRIGHT RUBBER NON-SKID

year will be a new non-skid tire, which has been named the Nobby Tread. The tread has three rows of big, thick, tough rubber knobs set diagonally to the circumference of the tire, for the tread. This diagonal flanged principle is claimed to be new. The knobs bring a great length of diagonal projections into contact with the roadbed at one time. The broad surface of the knobs is claimed to give nearly as much wearing surface as the plain tread tire.

The Ajax-Grieb Rubber Company, Broadway and Fifty-seventh street, New York. will show their Ajax tires. Two features of the exhibit will be the new Ajax nonskid tire and the new motorcycle tire of the same non-skid type. In addition to these the smooth tread models for both clincher and demountable rims will be displayed. Both the automobile and motorcycle models have the same style of diamond shaped raised rubber studs, and differ in appearance from other anti-skid tires. The raised parts are three-sixteenths of an inch in depth, arranged diagonally across the tread and far enough apart to prevent squeezing and flattening into a smooth surface when under weight and in contact with the road surface.

James L. Gibney & Brother, 215 West Broad street, Philadelphia, Pa., will show a line of rubber goods and automobile accessories, together with the Gibney wireless tire for trucks and other vehicles, and the Auto Eleck-Trick vulcanizers. Gibney wireless tire is retained in position by a layer of hard rubber permanently united with the tire proper. This hard rubber portion is securely attached to a steel base portion, which fits over the steel felloe band. Between the steel tire base and the steel felloe band, in a compartment formed by relieving the centre of the steel base, is a thin cushion of soft rubber. The steel tire base is made to fit the felloe band very closely, and is held in place by lug bolts which run through the felloe band. The felloe band is shrunk on the wheel.

The Continental Caoutchouc Company, 1788 Broadway, New York, manufacturers

of the Continental tires and rims, will exhibit their various styles of tires, viz., round, heavy, flat tread, coarse and antiskid, steel studded. The Continental demountable rim will especially be featured, and a practical demonstration given of its application and removal. This is said to be the only demountable rim which is made a regular equipment by manufacturers of automobiles up to date. The coarse, flat tread tires are adaptable for heavy touring and limousine cars; the tread rubber is corrugated, giving abundance of road traction. The steel studded tires are made with the studs integral with the tire.

The Howard Demountable Rim Company, of 152 North Broad street, Trenton, N. J., will display a demountable rim. The rim is secured in place by the turning of one bolt, so that the tire and rim will always be brought to the same place on the wheel, as they can go on only one way. Any of the quick detachable or clincher rims can be used. One-half of the wheel is oneeighth inch under size, while the other half is the actual inside diameter of the rim that contains the tire, so that when the expansion device expands one-eighth inch it has clamped and drawn the rim true from the centre of the wheel, giving 120 square inches of friction at surface, which is claimed to be sufficient to pull 8 tons when the rim is tightened up.

The Michelin Tire Company, of Milltown, N. J., will have a large and interesting exhibit of their various products. An interesting feature of the booth will be a Michelin anti-skid tire mounted on a Michelin demountable rim, the wheel being fixed on a mahogany stand. The anti-skid tire has steel rivets on the tread, which are an integral part of the tire. The tread is made of leather instead of rubber. In this leather tread are imbedded from three to five rows of steel rivets. The demountable rim on which the anti-skid tire is mounted has but eight small nuts and clamps, which hold the demountable rim in place when it is desired to change tires. Another exhibit is the Michelin quick detachable rim complete, with side and locking rings. Michelin round and flat compressed tread tires, tubes, tools and Mastic and Michelin new valve spreader will also be displayed.

The exhibit of the B. F. Goodrich Company, Akron, Ohio, will consist of the Goodrich white tough tread tires, in quick detachable and regular clincher styles. A feature of the exhibit will be the Goodrich metal stud tire, for winter use on slippery and ice coated pavements, which was first introduced by the Goodrich Company last winter. The tire is of regular construction up to the point where the tread is applied. The tread of this non-skid tire is made of imported tough leather, in which metal studs are securely inserted. It is then securely vulcanized to the rubber portion of the tire. The Palmer-Webb tire for electrics will also be shown.

The Swinehart Clincher Tire and Rubber Company, of Akron, Ohio, will show their regular line of solid and cushion tires for motor buggies, automobiles, delivery cars and heavy trucks. In addition to the above will be shown for the first time a line of pneumatic, quick detachable and clincher tires of standard construction. A quick detachable rim for truck tires will be shown for the first time also. It is claimed that the heaviest motor truck tire can be applied in thirty minutes, anywhere, without any other tools than an ordinary wrench. The Swinehart twin tread bridge tires for electric pleasure automobiles are another novelty.

The New Jersey Car Spring and Rubber Company, of Jersey City, N. J., will show their "Carpringo" tires and inner tubes in all standard sizes, together with their line of automobile mats and matting. In addition to the round wrapped tread tire, they will show their new anti-skid, in which the leather tread and rubber carcass are vulcanized together by a new process, which, it is claimed, positively prevents separation.

The Empire Tire Company, of Trenton, N. J., will feature their new type checkered non-skid tread and new demountable rim in connection with their complete line of automobile and motorcycle tires and accessories. Their leaders will be demountable rims, brake liner and ignition cable, while the accessories will include V belting, pyramid matting, auto tube, motobestos packing, tire protectors and preservers, tire tools, patches and repair kits.

C. A. Shaler Company, Waupun, Wis, will display their line of electric tire vulcanizers operated by city current, with automatic heat control. These are shown in the following sizes: Type D, private owner's model, for alternating current, for repairing tubes and cuts in casings; Type B, public or private garage model, for direct and alternating current; Type C, public garage model for repairing blow-outs in casings. In connection with the above will be shown two distinctly new models, one specially designed



SHALER VULCANIZER.

for motorcycle tires, which is the same as Type C, except that it fits motorcycle tires. The other, Type E, or gang vulcanizer, is for vulcanizing from one to six inner tubes at a time, and is particularly adapted for use in garages.

The Fisk Rubber Company, of Chicopec Falls, Mass., will exhibit their complete line of Fisk tires and rims. The models include the "bolted on" type with removable rim feature, clincher, Dunlop and quick detach-

able clinchers. The former of these, "the tire that is bolted on," is being featured, owing to the dispatch with which it can be applied or removed. The advantage of having to loosen only five nuts, remove the punctured casing, replace a new one in from two to five minutes, and start off again, is said to appeal to many.

The Newmastic Tire Company, of Sixtyeighth street and Broadway, New York, will exhibit and demonstrate Newmastic, an elastic, resilient material, for replacing air in pneumatic tires. Newmastic is manufactured in the form of a liquid, the liquid state being only temporary, as the compound is so composed that it becomes an elastic solid substance a few minutes after it is inserted into the tire. Tires are filled with Newmastic in the same manner that they are inflated with air, the filling being injected through the valve under pressure, the air being released at the same time by hypodermic needles. A new adjustable rim for use in connection with Newmastic has recently been perfected, and can be seen by those interested.

The Borroughs Remountable Rim Company, 225 West Fifty-seventh street, New York, will exhibit the "Dorian" rim, formerly known as the "Borroughs." This rim is simple in operation, as each pair of wedges are tied together, and by loosening four nuts two sets of wedges are released, permitting the rim to be removed from the felloe. The wedges are held in place by eight bolts, having the buttress tread, which absolutely prevents their working loose. Two of these rims will be mounted on wheels and stands where a practical demonstration will be given of mounting and demounting.

The Calmon Pneumatic Tire Company, 1639 Broadway, New York, will show a full line of Calmon imported tires. These will be seen in regular round, flat and anti-skid treads, in clincher and quick detachable clincher styles. The anti-skid tire has a leather tread studded, with steel rivets, the leather being vulcanized to the regular round tread tires. The flat tread tires have a leather face tread similar to the anti-skid, but are not steel studded. The line also includes the Calmon inner tubes, Ajax brake lining and autobestos packing.

P. C. Traver Manufacturing Company, Far Rockaway, L. I., N. Y., will display the Traver non-skid device in parts. This device resembles the ordinary mud chain in its application, but instead of the chain it has case hardened steel plates, shaped to conform to the tire, with sharp studs where it comes in contact with the road. One of the features of this device is the piano wire springs at the sides, which preserve an even tension of the device on the tire and prevent chafing.

The Consolidated Rubber Tire Company, 20 Vesey street, New York, will display their full line of Kelly-Springfield molded pneumatic automobile tires, in regular

clincher and quick detachable clincher types, embracing round, flat and Bailey treads. Their line of solid vehicle tires will also be shown, and they will make a feature of their new Block tire for commercial vehicles.

Victor Tire Traction Company, Boston, Mass., will exhibit the Victor anti-skids. The cross members of these tire chains automatically turn on swivels, which is claimed to obviate wear on tires and to prolong the life of the chain. This anti-skid, it is claimed, can be put on the wheel tight, and is, therefore, noiseless.

The G & J Tire Company, of Indianapolis, Ind., will display a full line of automobile and motorcycle tires, as well as a line of motorcycle grips, lamp connections and equalizing chambers. In addition to this, they have tire tools, cement, acid cure solution and blowout patches.

The Brown Company, Syracuse, N. Y., will display the Brown tire inflation indi-

cator, an instrument for determining the exact air pressure inside the tire. The indicator is attached to the tire valve, the air being pumped through it, the gauge hand indicating the pressure at all times. A number of other specialties will also be shown.

The Batavia Rubber Company, Batavia, N. Y., who have recently entered upon the manufacture of automobile tires and tubes, will exhibit their complete line of round wrapped tires, together with their non-skid tires.

The Rutherford Rubber Company, Rutherford, N. J., will show their full line of tires and inner tubes, as well as sections of different size tires, showing the construction of fabric and rubber. This line is known as the Sterling tires and tubes.

Zeglen Tire Company, Chicago, Ill., will exhibit their automobile tire, which is composed of a special fabric, claimed to render it puncture proof.

### Ignition Appliances

Geiszler Brothers Storage Battery Company, of 514 West Fifty-seventh street, New York City, will display a complete line of Geiszler igniter batteries, lighting batteries, Geiszler Midget batteries, electric vehicle batteries and the Geiszler Albino. Geiszler Albino is a trouble searching lamp. and consists of a bent spring brass plate upon which a socket for a miniature electric lamp is mounted and fitted with a very fine cupped reflector. The flat back plate is slotted at each end and a loop of flat rubber elastic is attached to each end. In service a flat back plate fits smoothly against a man's forehead, and the elastic band going around the head holds the Albino lamp in position, much after the fashion of a miner's lamp. light double lamp cord extends from the lamp and can be attached to the storage battery or other battery used on the automobile, by which means a very bright light is produced.

The Osborn Electric Company, Detroit, Mich., will display their line of dash coils, marine coils and plain box coils, together with their new magneto. The features of the 1910 dash coil are: (1) The switch, which does not depend upon the cover (made of hard rubber) for contact; (2) the vibrator, which allows for the adjustment of each unit at the factory for a current consumption of 0.3 ampere and a standard frequency; (3) the manner of fastening the units into the dash case, which gives a positive connection instead of the slip unit contact for such connection; (4) instead of wires brass rods are used, which are in view and can be seen at any time should anything go wrong with the coil.

The High Frequency Ignition Coil Company, of Los Angeles, Cal., in addition to the well known Seeley ignition system, will show the Seeley duplex magneto, a low

tension alternating current magneto which retails for \$35. This magneto is claimed to develop sufficient energy at 40 r. p. m. to ignite any charge. It is suitable for use with the Seeley ignition system, with vibrator coils or with a make and break system. It has only one moving part, which runs in Hess-Bright ball bearings, and is guaranteed for five years. The winding is so designed that the peak spreads out at high speed over almost one-half the armature revolution, making it impossible to advance or retard the spark out of the peak. This instrument is claimed to be waterproof.

The United States Light and Heating Company, of 30 Church street, New York, will exhibit a complete line of sparking batteries, together with their new auto sparker and lighter, which is used for both lighting and ignition. The company have produced a new light battery for electric lighting. The exhibit will also include the CB and WB types of batteries, together with the newer CBH and WBH types of plates, which are a compromise in the matter of thickness. In addition to the above the CBT and WBT plates will be shown for the first time. These are thinner than either of the above mentioned plates. The new style hard rubber jar for vehicle work will also be shown.

The Lutz-Lockwood Manufacturing Company, Aldene, Union County, N. J., will display the S X magneto, together with the S X ignition dry cell. The S X magneto is what is commonly known as the semi-high tension type; in other words, the machine generates a low tension current which is increased in pressure in a transformer. By a novel arrangement of the "make and break" device the low tension current is distributed to the transformer in two separate circuits of pulsating current. The transformer is made of two separate

units, having four terminals, from which connections to the plugs are made. By this system of distribution two spark plugs are operated in series, thereby getting a spark in each cylinder at the end of the compression stroke and the end of the exhaust stroke.

The Splitdorf Laboratory, of 261 Walton avenue, New York city, will exhibit specimens of their full line of magnetos and gas engine ignition apparatus, as well as a complete set of apparatus for showing the

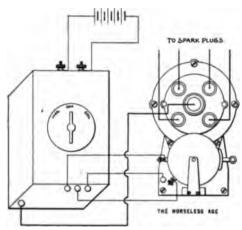


DIAGRAM OF SPLITDORF MAGNETO SYSTEM.

operation of each. One of the principal features of this display will be their new transformer. This obviates the necessity of carrying the high tension current to the dashboard for switching purposes, as was required with their regular transformer. This does away entirely with the large number of connecting wires.

The Auburn Mica Company, Auburn, N. Y., will exhibit the Auburn spark plug. This, as might be expected from the name of the company, is a mica insulated spark plug. The bolt shaped central terminal is exceptionally heavy, and is insulated with a

rolled mica tube composed of twenty-eight layers of pure sheet mica, which are claimed to withstand a pressure of 80,000 volts. This mica tube passes through a brass bushing, forming a gas tight joint. On both sides of the brass bushing the mica tube is surrounded with selected black mica washers, compressed under 2,000 pounds pressure, and claimed to be gas and oil proof. There is a large air chamber at the inner end of the plug, producing the well known self cleaning effect. The terminal of the outer electrode is made of platinum alloy, and the spark gap can be adjusted to any width.

The Witherbee Igniter Company, of Springfield, Mass., will exhibit their full line of batteries, spark plugs, timers, trouble lamps, ignition cable, etc. There will be seen two new articles, a new battery for lighting of 100 ampere hours, and the new Wico self contained igniter, containing some features not contained in other magnetos. This instrument generates an intermittent current, and does away with the condenser, breaker box and primary winding, with which other magnetos are equipped, simplifying the working of the machine. This igniter will generate as hot a spark on a quarter turn as it will when running at engine shaft speed; that is, the heat and voltage of the spark produced are independent of the motor speed, and, besides, a motor equipped with this igniter will start on compression by advancing and retarding the spark lever.

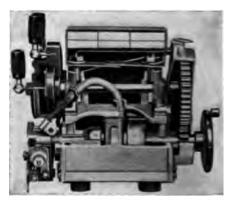
Atwater Kent Manufacturing Works, of Philadelphia, Pa., will exhibit their well known Atwater Kent spark generator and their new Unisparker. The Atwater Kent spark generator was the original single spark ignition device, and is used on a number of well known machines as a standard equipment. Only one spark is produced for each ignition, which results in great battery

THE HORSELESS ASE

SECTIONAL VIEW OF SPLITDORF MAGNETO.

economy. Dry batteries are commonly used with this device as the current source. The Unisparker is a smaller device of the same general type, which can be secured to any motor in place of the regular timer.

The Remy Electric Company, of Anderson, Ind., will exhibit a complete line of their magnetos. Two standard types of machines will be shown, Type T, for small powered motors of two or four cylinders, and Type S, for high powered motors of two, four or six cylinders. These magnetos are of the inductor type. and the range of spark timing has been increased one-third, while better facilities have been made for oiling, so that it is all done at one place at the top of the magneto. A cross section of the magneto will be shown, so that the position of the armature winding and the operation of the revolving inductors can be readily understood by the inexperienced The magneto is without revolving wires of any kind, doing away with all moving contacts and brushes. The stationary



SECTION OF REMY INDUCTION MAGNETO.

winding is direct connected through the magneto circuit breaker to a non-vibrating transformer coil carried in a neat, highly polished box on the dash. The coil is equipped with a two point switch for battery connection, which gives a dual system with one set of spark plugs, and a simple movement of the switch controls both systems.

The Union Battery Company, Belleville. N. J., are planning a very comprehensive display of their batteries, flashlights and ammeters. The flashlights will comprise many different shapes and sizes. The dry cells shown will vary from the small motorcycle cell up to 45 to 50 ampere cells for large gas engine use. The Union dry cell is put up in square cartons, which makes it convenient to pack in battery boxes and prevents the cells from shifting or turning. These cells can also be had in round cases if it is preferred.

Stanley & Patterson, 23 Murray street, New York, will exhibit their wireless battery holder. The holder resembles the ordinary battery box in outward appearance, the batteries being attached to the top by means of a thread by which they are screwed into place. The box is equipped

with lock and key, making it impossible for any one to tamper with its contents during the absence of the owner or driver, by substituting poor for good batteries, for instance. There are no connections to be made except those to the box itself.

Lavalette & Co., 112-114 West Forty-second street, New York, sole owner of the American patent on the Eisemann-Lavalette magneto, will show magnetos, with separate coils, and also the direct high tension type. A relatively new feature of these magnetos is the helicoidal pole pieces, which are claimed to prevent demagnetization, and also to allow of successful operation of the magneto at slow speeds. A novelty is to be found in the oscillating type of magneto, which gives practically an unlimited range of advance. The firm will also exhibit their new light magnetos for aeronautic purposes, in which all the possible parts are made of aluminum alloy.

In the display of the Bosch Magneto Company, 223 West Forty-sixth street, New York city, will be seen twenty-five typical examples of high tension magnetos for 1, 2, 3, 4, 6, 8 cylinder motors, together with five types of low tension magnetos with the magnetic plug ignition system for automobiles, and several of the low tension magnetos with magnetic plugs adapted for



BOSCH DUAL SYSTEM SWITCH.

automobiles, motor boats and stationary engines. Besides, magnetos for motorcycles with 1, 2, 4 cylinder motors will be shown. The Bosch dual ignition system will also be exhibited, and one new form of this system will be shown for the first time. The more important types will be shown on demonstration tables, and some of the magnetos will be run by electric motor to show the intensity of the spark.

Among the new things that will be shown by the Pittsfield Spark Coil Company, of Dalton, Mass., is a magneto for large stationary gas engine use. This magneto is somewhat larger than that made by the company for automobile work, and will give a 1 inch spark at a very low speed. A new dual system will also be shown with a coil contained in the magneto. Other things shown will include motorcycle magneto, coils, timers, switches, plugs, etc.

Herz & Co., Lafayette street, New York city, will show their well known line of tim-

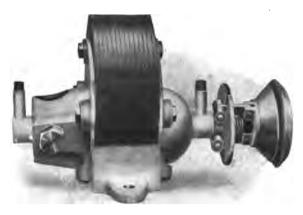
ers for automobile motors, from two cylinder to six cylinder; also the Herz distributor for any number of cylinders; ignition cables, French coils, imported storage batteries, French asbestos copper gaskets, Mercedes spark plugs, B & S air pumps, Moto whistles, Herz dust and water proof cover switches, Herz safety switches, wire terminals, Pater Noster shock absorbers and a complete line of ignition accessories.

The Motsinger Device Manufacturing Company, of Pendleton, Ind., will exhibit their low tension magneto, which can be

equipped either with a friction drive or geared to run in time with the motor cam shaft. This magneto can be easily applied to any engine, as it may be placed horizontally, vertically or at any angle around the flywheel, and can be driven from the front, back or outer surface (inside or outside of the rim). The friction wheel is made of compressed leather and is carried in a metal back. The pulley is easily removable for replacement. Lubrication is by the wick system.

The Westinghouse Companies, Boonton, N. J., newcomers in the ignition end of the industry, will exhibit three distinct lines, viz., electric motors, mercury rectifier charging outfits, and vehicle sparking batteries. These products were developed by the Westinghouse Machine Company. The storage batteries are made in both standard and high capacity types. The mercury rectifier charging outfit will be shown in operation.

J. S. Bretz Company, Times Building, New York city, sole importers of U. & H. magnetos, F. & S. bearings and Bowden wire, will display these goods in two all-



MOTSINGER LOW TENSION MAGNETO.

glass cases, 24 inches square and 24 inches high, mounted on heavy Mission tables. A ball bearing crank shaft which is used on the Stearns four cylinder car is also to be shown. The F. & S. annular ball bearings will be neatly mounted on a four sided birdseye maple pyramid in one of the cases, and ten U. & H. master magnetos, of different styles and sizes, on terraced platforms of birdseye maple, in another glass case. This permits of effective display of the samples, and protects them from dust and dirt and rude handling. The glass tops of the cases are, however, readily removed. The Bowden patented wire mechanism is used for the transmission of reciprocating motion in an indirect path around obstacles, etc., and is adapted for the operation of brakes, ignition and throttle controls, sprags and muffler cut-outs

Kokomo Electric Company, Kokomo, Ind., show a line of ignition specialties, including quadruple vibrator coils put up in nicely polished hardwood boxes for dash mounting, and the Kingston spark plug, which is made with three different threads as follows: one-half inch standard, seveneighth-eighteen A. L. A. M. and metric.



U. & H. MASTER MAGNETO, TYPE L. E. 4, SHOWING DISTRIBUTOR END DISASSEMBLED.

The Electric Storage Battery Company, Philadelphia, Pa., will exhibit their Exide battery for electric vehicles, together with their Exide sparking battery. It is claimed these batteries are long lived and of high capacity for their weight and bulk.

The New York Coil Company, of 338 Pearl street, New York city, will exhibit their line of coils running on battery current, low tension magnetos and mechanical interrupters, in connection with a full line of switches.

The National Carbon Company, Cleveland, Ohio, will show the Columbia multiple battery for ignition on internal combustion engines of any kind. The Columbia multiple battery is said to contain no acid, to be waterproof, to require no charging, and not to leak or spill.

Vesta Accumulator Company, Chicago, Ill., exhibit their Vesta sparking battery for the ignition of automobile engines. These batteries have been on the market for many years.

### Axles, Bearings, Springs, Frames.

The Timken Roller Bearing Company, of Canton, Ohio, will display three complete series of Timken roller bearings-long series, short series and annular replacement series. These bearings are adapted for use on front axles, rear axles, transmission shafts, jack shafts, pinion shafts, and in steering gears, knuckle heads, differential hubs, clutches, fan, etc., and will be shown complete in various sizes. The new series of Timken roller bearings are of the same dimensions as the most commonly used sizes of annular ball bearings, and can be used with little or no change in the place of annular ball bearings. In addition, a full line of pleasure cars and motor truck hubs

The International Engineering Company, of 1779 Broadway, New York city, will show a most complete line of R. B. F. radial and thrust bearings, together with Lemoine springs, axles, forging hubs, etc., and Lemoine mangano-silicon steel, especially adapted for gears. Several new lines of thrust bearings will be seen, principal among which will be those especially designed for automobile wheels to take the place of roller bearings. Another novel portion of the exhibit will be a line of bearings designed solely for magnetos. A duplicate of the apparatus used by Lemoine in testing steels will be on exhibition, and its operation ex-



TIMKEN 1910 PRESSED STREL REAR AXLE, WITH COVER REMOVED.

will be shown mounted on Timken roller bearings.

The Timken-Detroit Axle Company, of 168 Clark avenue, Detroit, Mich., exhibit will consist of a number of styles of I section front axles for pleasure cars complete with Timken adjustable roller bearings; three of the new type rear axles with pressed steel differential housing and roller bearings, and three commercial truck axles mounted on Timken bearings. The two larger sizes of front axles have Timken adjustable bearings in the steering knuckle. One of the strongest features of the rear axles is that the differential and bevel gears are removable as a unit through the rear by removing the housing cap.

The Perfection Spring Company, of Cleveland, Ohio, will exhibit a collection of flat leaf automobile springs of various types and models; also springs in parts, showing the construction, as well as mounted types to show the correct connection between frame and axle. The springs are all hand made from crucible, Krupp silicomanganese, or crucible chrome-vanadium steels.

The Standard Roller Bearing Company, annular ball bearings, ball thrust collar bearings, groove ball thrust bearings, etc.

of Philadelphia, Pa., will have no novelties this year, but show several different types of automobile axles and a large range of



R. I. V. BALL BEARING.

The exhibit of the R. I. V. Company, 1771 Broadway, New York city, will const chiefly of the R. I. V. radial bearing the distinguishing feature of which is its presed steel separator, which equally spaces the balls. The separator is stamped out to a radius slightly larger than the balls. This forms a hollow reservoir around the ball for the storage of oil or grease. The rings come in two sections, being held together by two special screws. Ball thrust collar hearings will be shown in divers shapes and sizes. In connection with the above will be shown for the first time the S. B. R. muifler cutout, which is easy to apply to any car. The valve is made to open against pressure of the exhaust in order to prevent leaks, and is applied by sawing out a pottion of the exhaust pipe on the bottom and clamping the cutout to it.

The exhibit of the American Ball Bearing Company, Cleveland, Ohio, will include tubular and I section front axles, complete with hubs and connecting rods, and will mclude several types and sizes of bevel drive rear axles complete. One of the novelbes will be a small pressed steel bevel drive rear axle of semi-floating type. This axle is fitted with "annular" ball bearings at the outer end. The axle shafts and drive shafts are made from vanadium steel. The spring seats are machined drop forgings. Several new types of I section front axles will also

### Metals, Forgings, Stampings, Castings.

Isaac G. Johnson & Co., Spuyten Duyvil, New York city, will show a wide range of steel castings, made by them, of various automobile parts. The steel used in these parts can be forged and welded. It can be case hardened and will bend freely when cold before breaking. The steel is easy to machine and finish, and resembles machinery steel in some respects. It is claimed that this metal is suitable for crank shafts, connecting rods, front and rear hubs, axles, spring hangers, foot brakes, radius rods, sprockets, gear cases, levers, etc. The tensile strength of this steel is claimed to be 80,000 to 85,000 pounds per square inch, and the elongation 15 to 18 per cent.

John A. Salman & Co., 17 Bromfield street, Boston, Mass., will exhibit a line of

automobile names and monograms, and monograms for all accessories pertaining w the automobile, manufactured in all metals. They will also show an exclusive line of monogram belt pins and buckles, as well as monogram watch fobs. Some of these are stampings, others castings,

Light Manufacturing & Foundry Company, of Pottstown, Pa., are specialsb in the manufacture of aluminum, marganese bronze and bearing metal castings especially adapted to automobic, autoboat and aeroplane work. Their antomobile brand of aluminum castings will be made the predominating feature of their exhibit, together with a metal they designate as Aerial brand aluminum castings, especially adapted for aerial work

This metal is slightly lighter than aluminum alloys used for general purposes.

The Vanadium Metals Company, of Pittsburg, Pa., will display a line of vanadium-aluminum crank cases, gear cases, pedals, etc., which are claimed to give double the strength of ordinary aluminum. Vanadium metals are adaptable for axles, levers, gears, crank shafts, casings, lamps, bearings, bushings and all parts liable to shock, vibration, unusual stresses and functional wearing. Victor vanadium bronze is claimed to have the physical properties of steels and anti-corrosive qualities peculiar to bronze compositions. Victor vanadium non-corrosive silver metal is adaptable for levers, lamps, trimmings and ornamental parts of all kinds. This silver metal never tarnishes, but always retains a very high silvery polish.

The Standard Metal Work Company, Thompsonville, Conn., will exhibit a wide variety of gas intake manifolds, water inhas fine brass wires intertwined in each strand, and designed to withstand the high temperature and pressure of gasoline motor work. It is claimed for Non-Burn brake lining, as the asbestos lining is known, that it cannot be charred or burned even by a blowtorch giving 2,000° Fahr. The manufacturers claim that No-Leak, when mixed with water and applied like putty to cylinders, pipes or radiators, metallizes and becomes a part of the article to which it is applied.

The Standard Welding Company, of Cleveland, Ohio, will exhibit a wide variety of electrically welded automobile parts. These will include many new samples, some of which are intricate in their design and construction. Among these will be seen several types of detachable and demountable rims, and quite a variety of motor exhaust manifolds, together with motorcycle and bicycle rims and frame parts.

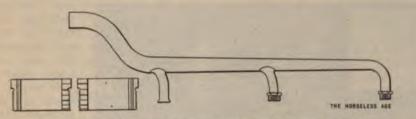
Thomas Prosser & Son, 15 Gold street, New York, who are the United States representatives of the Krupp Steel Works in Essen, Germany, will exhibit a variety of forgings of automobile parts, chiefly crank shafts, gear blanks, front axles and rear stationary axles, made from Krupp alloy steels. These forgings are used to quite an extent in the high grade cars on the American market.

Columbia Nut and Bolt Company, Bridgeport, Conn., will show their Columbia lock nut, which consists of two parts, one within the other. The inner part is split and is of hexagonal, tapering form; it fits into a hexagonal tapering opening in the outer part. As the nut is being drawn up by means of a wrench applied to the outer part, the inner, split part is tightly compressed on the thread, whereby the nut is securely locked.

The exhibit of the William Cramp & Sons Ship and Engine Building Company, of Philadelphia, will consist of castings of Parsons' manganese bronze, such as axles, lamp brackets, engine frames, connecting rods, transmission gear cases, brake bands and Parsons' white brass bearing castings.

A. O. Smith Company, Milwaukee, Wis., exhibit samples of their pressed steel automobile frames and other pressed steel parts. The company claim to have produced 60 per cent. of all the pressed steel automobile frames used by American manufacturers during the past year.

The Lebanon Steel Casting Company, Lebanon, Pa., will show a large quantity of steel castings, consisting of sprockets, hubs, gears and other automobile parts.



GAS ENGINE MANIFOLD, SHOWING "DIVPLUG" CONNECTIONS.

take and outlet manifolds, and other forms of brass and copper tubing for automobile work; also exhaust manifolds made from seamless steel tubing, and exhaust pipes of seamless tubing, with which is used their patent Divplug for cylinder connections.

Hayes Manufacturing Company, Detroit, Mich., will show a line of sheet metal automobile parts and accessories, such as radiators, hoods, fenders, motor and garage pans, metal tool and battery boxes and forged irons. They have patterns and dies to make fenders, forged irons, tool and battery boxes for most of the standard makes of cars.

The H. W. Johns-Manville Company, of too William street, New York, will display their line of asbestos packing and brake lining; No-Leak, a chemical packing compound; dry powder and chemical fire extinguishers, asbestos wood, asbestos roofing and siding, and automobile friction tape. The asbestos packing is known as Mobolene gas and gasoline engine packing, and



HAYES PRESSED STEEL TOOL BOX.

### Signaling Devices.

The Sireno Company, 39 Cortlandt street, New York city, will show eight different styles of Sireno horns. The Sireno Midget, the smallest of the horns, will be specially featured, together with the Sireno steering wheel switch and special floor board switch. The Sireno Midget is about 9 inches long over all, and weighs but 3 pounds. It is claimed that its tone closely resembles the human voice, and is an agreeable sound. The steering wheel switch is designed to be attached to a spoke in the steering wheel. The wires running from the switch are enclosed in a flexible brass tube. The floor switch is designed for heel operation, to be attached to the floor boards and projects through the bottom, the wires being attached by means of split spring plugs, allowing the floor board to be easily removed without disturbing the wires.

Lovell-McConnell Manufacturing Company, of Newark, N. J., will show the full line of Klaxon signaling devices manufactured by them. In sound and operation the Klaxon is unlike any other warning signal for automobiles. It is operated by an electric motor running at 3,000 r. p. m., and using current from the ignition battery. At the top of the motor shaft is a toothed wheel which strikes a hardened button in the centre of a 5½ inch steel diaphragm, producing 500 double vibrations per second. The effect is a bass toned roar, loud

enough to be heard a half mile away, and of a characteristic attention-compelling quality which distinguishes it from all other sounds. The Klaxon comes in many different sizes, suitable for every signaling purpose for automobile, motor boats, etc. The Lacoste timer and insulated wire terminal will also be shown.

Nightingale Whistle Manufacturing Company, 1777 Broadway, New York, exhibit the signaling device known as the Nightingale whistle. When they first took over the whistle from the French firm which introduced it into this country they reduced the price to \$7. They then perfected the method of attaching the device to cars, and claim that it is now possible for anyone,



KLANON SIGNALING DEVICE.

not necessarily a mechanic, to attach the whistle in less than an hour. They carry a stock of special clamps to fit any exhaust pipe, thus simplifying the attachment. A new motorcycle signal known as the "Midget Nightingale" has just been brought out. This company also handles a compressed air outfit for garages, comprising the Delpeuch air compressor, which the company has been marketing for two years, a storage tank with safety valve, globe valve and all necessary fittings. The compressor is of metal throughout, containing no leather washers or packing.

The Nonpareil Horn Manufacturing Company, 139 Emerson place, Brooklyn, N. Y., will display their complete line of horns, bulbs, reeds and flexible tubing. A new oval bell reed in the centre of the tube horn, with a deep, pleasing tone, willbe shown, with an entirely new model with several large very compact coils, and an exceptionally deep, clear tone.

The Gabriel Horn Manufacturing Company, Cleveland, Ohio, one of the pioneers in the manufacture of horns of the exhaust blown type, will show their regular line, besides their new four tube horn, known as the Gabriel trumpet. This is a horn operated by keys so arranged that all the bugle calls used in the United States Army can be played on it. They also have a ten note "music horn," which can be used to play almost any of the simpler melodies. They are also showing the Foster shock absorber, recently described by us.

### Garage Appliances, Jacks, Tools, Etc.

The Dover Stamping and Manufacturing Company, 385 Putnam avenue, Cambridge, Mass., will display their complete line of sheet metal automobile specialties, chief of which will be their new shut-off funnels, new garage measure and new tourist oil and gasoline kit. In connection with the above will be shown a wide variety of hand oil and storage oil cans, including the compact oiler, auto pump oiler, squirt cans and non-leakable steel oilers, besides waste cans, garage pails, drip pans and motor boat fog horns.

The Elite Manufacturing Company, of Ashland, Ohio, will display their line of lifting jacks and storage jacks. They have a new lifting jack, with adjustment from 12 to 27 inches, with a handle so arranged that when the load is raised it falls closely to the stand and is out of the way. The Reliable tire saver, another new production, is used to relieve the tires of their weight. This is constructed of malleable iron, and has a swivel top and leather faced saddle, which when placed under the hub takes up practically no room, and enables one to place machines in the garage as closely as desired. The storage stand is used for the same purpose as the tire saver, but is a lit-



ELITE JACK.

tle cheaper. The ratchet jack is known as the "Ohio" ratchet. It is new and has several commendable features.



HYDRAULIC STORAGE SYSTEM.

Janney, Steinmetz & Co., of Philadelphia. will have on exhibition various sizes of their well known seamless steel tinned and tested tanks, including a new oval shape. They will show tanks adapted for both gasoline and compressed air. Since these tanks are of seamless construction they are claimed to be absolutely free from the possibility of leakage. They will also have on exhibition their "Flashlight" spark plug, which is fitted with platinum iridium points, rendering it particularly well adapted for use with magnetos. They will also show various designs of pressed steel brake drums, and will have on exhibition for the first time two types of gasoline storage outfits of 55 and 110 gallons capacity. respectively. The tanks for these outfits, will be welded-seamless construction and they will be equipped with two types of pumps, one for use directly over the tank and the other for use when the tank is located at some distance from the pump. They will also have at their booth samples of "Richards" aluminum solder, the sale of which is controlled by them.



JANNEY-STEINMETZ GASOLINE TANK

The Hydraulic Oil Storage Company, of New York, will exhibit the Hydraulic ga rage gasoline system with its counterlalance and flexible seamless copper hose, whereby, it is claimed, a car can be filled with gasoline without the driver leaving bit seat, in 40 seconds, as against 12 to 20 mm utes when the gasoline is strained through chamois. In connection with this system will also be shown a new float sight gange which is always in plain view of the open ator. The especial features of the hydradic system are the "full tank" and top feel These are claimed to prevent dirt and water getting into the tank and to obvine danger, evaporation, and the necessity of straining.

Coes Wrench Company, Worcester, Mass., will display it sizes and styles of their wrenches, comprising mechanics model, round bandle, knife handle, hammer handle and sted handle models. The proppal feature of the exhibit will be the Coes steel handle screw wrench, with a ball for

screw thrust. The handle is a shell internally supported. A steel ball is inserted into the face of the bar and runs in a new ground on the screw next to the knurled thumbscrew, the screw being forged and hardened. Another feature is a 6 mm wrench, with an opening of 1 me inches, which can be handily carried in the power if desired.

The A. S. Noonan Tool and Machine Works, of Rome, N. Y., will display a nost complete line of tools and specializes Noonan's chisels and punches will be shown and a severe demonstration given. This test will consist of driving these chisels through heavy pieces of iron. The exhibit will include something new in a swage to repair front oval knuckle arms and tie rod connections. Another new tool is an automore chuck for locating and attaching speedon eter gears to a front wheel hub so they will run concentric with the hub. In addition to the above, there will be shown trunk racks, valve truers, valve spring lifters, fire tools, bent end screw drivers, cotter pin tools, tire irons, the "Four-in-One" tool. consisting of a valve, top, die and reamet, wheel removers, muffler cut-outs, thus clamps, roberails, foot rests, a clamp for npairing motorcycle chains and a tool for repairing belts.

Cryder & Co., Park avenue and Sixtythird street, New York, are showing as

their leader the Ronson wrench, the Kempshall tire, the Marles blow-out patch, Acheson Oildag and graphite greases and the Hermetic frictionless tire lug. The Ronson wrench is composed of four open end wrenches with openings from three-sixteenth up to thirteen-sixteenth inch. These are held together by means of a small, square shouldered bolt, washer and thumb screw. The whole combination can be conveniently carried in a tool kit and replaces tools that would take up much room in a tool box. The combination gives nine distinct wrenches with a total weight of only a half pound. The openings for the wrenches are set eccentric, which gives a wide range of use, permitting one to get into inaccessible places, and owing to their thinness the wrenches can be operated through very narrow openings.

S. F. Bowser & Co., of Fort Wayne, Ind., will show a varied line of their product. They will present representative outfits from their automobile accessories department for private and public garages. They will show portable and stationary gasoline tanks, their oil tanks—self measuring and fireproof—and their pump meters and filters.

The Wayne Oil Tank and Pump Company, Fort Wayne, Ind., will exhibit their

line of oil and gasoline storing and pumping apparatuses. The oil tanks are made of heavy sheet metal, and have the pump secured to the top, while what is known as the long distance gasoline storage outfit consists of a steel barrel with filling tube, buried in the ground, outside the building, and connected by means of a pipe to the pump inside the garage.

The Oliver Manufacturing Company, Chicago, Ill. The Oliver jack is of the double ratchet type, a motion of the lever either up or down lifting the car. They are made in various heights, from 10 to 13 inches, and with a lift of from 7 to 9 inches. The handle is so formed as to make a good tire tool in case of necessity.

Motor Parts Company, Plainfield, N. J., will exhibit their Auto-Clé wrenches, a set of socket wrenches and their automobile steps. The company was formerly known as the Q. M. S. Co., and has exhibited at a number of previous shows.

The Perfection Wrench Company, Port Chester, N. Y., will exhibit the Perfection quick adjustable wrench. This wrench adjusts itself to nuts of various sizes instantly. It is made entirely of steel of good length to lend leverage.

### Carburetors, Oilers, Pumps.

The Gasoline Motor Efficiency Company, of Jersey City, N. J., are displaying a new device, known as the "Homo," which is inserted between the intake manifold and the carburetor. It contains a wheel with propeller blade spokes, which is covered with galvanized iron wire gauze. The wheel revolves inside the gauze upon hardened steel pivots set into bronze cup screws, owing to the action on it of the incoming charge, and this is claimed to break the gasoline up into very small particles and to cause the air to be perfectly saturated therewith. The casting or housing containing this wheel and wire gauze is 11/4 inches in thickness, and sets anywhere between the carburetor and the intake manifold.

The Stromberg Motor Devices Company, Chicago, Ill., will make a feature of a 500 horse power carburetor complete in every detail, which will be exhibited in addition to their regular line, which includes a water jacketed carburetor, a concentric type carburetor and a new carburetor designed specially for six cylinder motors, which is automatic in its action and which, as far as appearance is concerned, is very similar to the water jacket type.

Wheeler & Schebler, of Indianapolis, Ind., will show their full line of carburetors, together with parts of same showing the construction and adjustment of the various types. An entirely new model will be shown, known as Model L. This type has many features which are standard of all Schebler carburetors, and has the fol-

lowing new features: The air valve is arranged to draw air from the top to the bottom. The leather air valve is backed up by a brass plate, preventing danger of buckling. It has a long bearing or sleeve, and travels on a rod supported at both ends, insuring perfect alignment. The amount of fuel entering the mixing chamber is controlled automatically by means of a needle valve directly connected to a roller operating on a track adjustable to different profiles. Adjustment for low speed is made direct with the needle, and for high and intermediate speeds by varying the track.

A. R. Mosler & Co., 163 West Twentyninth street, New York, have added a carburetor to their line of ignition specialties. This carburetor is the design of George A. Breeze, who has been making carburetors for many years. A priming device without moving parts is embodied in the lock nut which holds the fuel bowl to the main body. This nut also forms the opening for the main air intake and is covered by a wire screen. When the carburetor is primed a cup in the bottom of this nut catches the overflow of gasoline, and this overflow spreads by capillary attraction over the whole wire screen. On turning the engine over, the air drawn through the screen is sure to take up a sufficient amount of gasoline. The screen also prevents backfiring. fuel strainer excludes dust and dirt, thus obviating flooding. The carburetor is of the float feed central draught type and embodies the Venturi tube principle. The large auto machine air valve is placed horizontally, to obviate fluttering, due to jouncing on rough roads. It can be adjusted with the fingers. A graduated disc and ratchet spring on top facilitate setting of the fuel valve. The gasoline connection is for a ¾ inch pipe and can be turned, at any angle.

The Breeze Carburetor Company, of 276 Halsey street, Newark, N. J., will exhibit the automatic Breeze carburetor in several sizes, the Breeze fuel strainer, Breeze check valve and their new Breeze Baby motorcycle carburetor. The fuel strainer is designed for insertion in the gasoline line as close as possible to the carburetor, and collects oil and sediment that may be in the gasoline. The M. C. Special is an automatic type of Breeze carburetor designed for motorcycles. In this model the auxiliary air valve is placed on the back end of the mixing chamber, allowing for an increase in the auxiliary air.

Siro Carburetor Manufacturing Company, 27-35 Taylor street, Springfield, Mass., will show a line of their Siro carburetors, which are mechanically controlled. At the bottom there is a deep bowl shaped casting, forming the float chamber, and a curved tubular fitting, forming the mixing chamber, is cast integral with the cover plate of the float chamber. The gasoline feed can be adjusted at will by the operator by means of a needle valve. An air damper valve is placed near the opening of the air admission elbow, and the throttle valve and dosing device are mechanically interconnected. The carburetor is controlled through a gear and ball bearing shaft connections.

Byrne, Kingston & Co., Kokomo, Ind., will exhibit the Kingston carburetor, which is of the floating ball type, with single adjustment. The special feature of this carburetor consists in the provision of five supplementary air inlets, which are controlled by bronze ball valves. The fuel adjusting valve is located centrally at the top of the carburetor, which makes it unusually accessible.

### Benz Private Exhibit.

The Benz Auto Import Company of America have issued an announcement to the effect that they will not exhibit at either of the New York shows, but will have a private display of Benz 1910 models at their showrooms at 1599-1601 Broadway during the two show weeks.

Among the many valuable trophies which will be exhibited by the members of the Importers' Automobile Salon at the A. M. C. M. A. Show in the Grand Central Palace during the first week in January is the Grand Prize of the Automobile Club of America. This is a solid cup containing 18 pounds of pure gold, and was won by Lewis Wagner in Savannah in a Fiat.

### Differentials, Steering Gear, Shock Absorbers, Brakes.

Kilgore Manufacturing Company, of 585 Boylston Street, Boston, Mass., will have on exhibition their line of air cushioned shock eliminators, including their new model for light cars of 2,000 pounds and under. The new shock absorber is 2½ inches in diameter, and has a recoil check in the side which reduces the recoil, as



MODEL 1910 KILGORE AIR SHOCK ABSORBER.

well as cushions the downward plunge, thus protecting the springs both down and up. They are also exhibiting a longer cushion for the rear which will allow a greater spring play, and yet absorb the excessive motion of the springs in a cushion of air.

Ernst Flentje, Cambridge, Mass., will show his improved glycerine hydraulic jounce and recoil preventer for automobiles. The 1910 model has an improved and larger stuffing box in which a spiral spring is placed over the packing. This spring takes up all the settling of the packing and prevents leaking of the filler. The piston rod is also lubricated by means of the packing, and consequently does not need any oil whatever. The piston itself contains an adjustable valve through which the preventer can be instantly adjusted. This valve is said to be positive in its action.

The Royal Equipment Company, 165 Housatonic avenue, Bridgeport, Conn., will exhibit the Raymond brake, the Duplex brake, Raybestos friction lining, Besto friction lining and Stability facing. The Raymond brakes are well known. The Duplex brake is a double acting brake for machinery and vehicles where the braking effect needed is relatively large, compared with the operating force. The well known wrap-

ping or winding effect of a flexible band surrounding and in contact with a rotating drum insures this result. One end of the flexible band is fixed, while the operating force is applied to the other end in the direction of the rotation. In order to secure this effect in both directions of rotation means are provided by which either end of the band automatically becomes the fixed end, depending upon the direction of rotation of the drum.

The Hartford Suspension Company, of Jersey City, N. J., manufacturers of the Truffault shock absorbers, will display two miniature automobiles, one equipped with shock absorbers, the other not. The wheels of the two cars are revolved by pulleys under each. On these pulleys are two projections of uniform size which come in contact simultaneously with the wheels of the cars at a speed of 100 r. p. m. Each of the cars thus gets 200 bumps every 60 seconds, producing the same effect, as regards the riding qualities of cars, as if they were going over an extremely rough road. The cars are identical in every respect, and the shock absorbers with which the one is equipped are exact duplicates of the larger shock absorbers made by this company.

The Gemmer Manufacturing Company, 741 Merrick avenue, Detroit, Mich., will exhibit their three types of steering gears. While retaining the same general design as before before, the product of this company has been refined and improved in general construction. The spider of the wheel has been made stronger and of better appearance. To the standard line of wheels, which includes the types with aluminum spider and mahogany laminated rim, has been added one with aluminum spider and molded rubber rim. One of the important improvements shown is the universal form of housing, which may be placed at any angle and may readily be attached to any car. Columns are now furnished of 11/2. 13/4 and 2 inches diameter.

R. E. Dietz Company, 60 Laight street, New York, exhibit their line of automobile lamps, including kerosene, side and tail lamps, the Dietz Majestic Mirror lens headlight and acetylene generators. The company have also recently brought out new designs of electric headlights, which will be shown along with their former goods.

Heinze Electric Company, Lowell, Mass., exhibit the Heinze new low tension magneto, which has been fully described in these columns. It is claimed for this magneto that it will insure proper ignition at as low a speed as 50 r. p. m. of the motor. They also exhibit Heinze spark coils, which are made in considerable variety, both of the plain and vibrator type. Their line of ignition specialties also includes timers and switches.

The Rushmore Dynamo Works, Plainfield, N. J., will feature their Multiplex

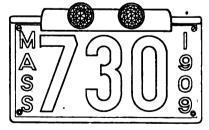
lamps. These have a number of glass strips in the front door designed to reflect the rays of light so that they cross each other. thereby forming a horizontal spreading beam. Each of the strips produces such a spreading beam of a width nearly equal to the entire illuminated field. These several beams (from four to six in number, according to the size of the lamp) overlap each other, so that the total illumination is the sum of the several superposed spreading beams. The effect of thus dividing up and superposing the illumination is said to be that swaying of the flame becomes imperceptible. The exhibit will also include the Rushmore automatic shaking grate generator in its new form, and the old style lamp, with plain glass strips in the front door.

The Woven Steel Hose and Rubber Company, of Trenton, N. J., will exhibit a line of autobestine brake lining. This is a combination of mineral and fireproof substances, and is claimed to be indestructible under any degree of heat. In connection with this will be seen mechanical rubber goods, steam and hydraulic packings.

J. H. Sager, Rochester, N. Y., exhibits the Sager coiled spring equalizer and the Sager bumper. The equalizer consists of a barrel shaped coiled spring under tension, which is inserted betwen the axle and the frame of the car, and acts in the same manner as a shock absorber.

The Baldwin Chain and Manufacturing Company, Worcester, Mass., will exhibit, besides their regular well known line of chains, a new steering gear, which will be seen for the first time. This steering gear will be made the chief feature of their booth

Gray & Davis, Amesbury, Mass., will exhibit their full line of lamps, including a new type of gas lamp. This is a close coupled lamp, and will be shown in two series of styles, one with large flaring flange or opening in front to allow the light to spread; the other of searchlight form, with a small flaring flange. Both styles are equipped with a front silver reflector put in for looks and reflecting powers. There will also be seen combination gas and electric lamps. The



GRAY & DAVIS REAR ELECTRIC LAMP AND NUMBER.

electric lamp can be folded down out of the way when gas is being used.

Frank H. Cross, 1773 Broadway, New York, will feature a close coupled, short focus acetylene gas head lamp of original design. This lamp has a body of heavy gauge brass spun in one piece and a short focus mirror claimed to be of great light giving qualities. There is a gas chamber at the base of the burner to prevent flickering of the flame, and does away with the need for a rubber bulb on the pipe line. All parts of the lamp are said to be easily replaceable. The various lines to be exhibited by Mr. Cross are as follows: Hofacker's automobile head, side and tail lamps, swivel searchlights, electric auto lamps, storage batteries and gas generators; brass robe and foot rails, bumpers and other brass goods; National gasoline tank gauges and portable steam vulcanizers; tool rolls and repair gloves of water and grease proof material, and the Hazen-Brown Company's rubber cement, cold vulcanizing substitute, rubber acid cure, etc.

The Edmunds & Jones Manufacturing Company, of 432 Lawton avenue, Detroit, Mich., will exhibit a full line of their gas searchlights, headlights, oil side and tail lamps, and the E. & J. generators. One feature of their lamps is that they are all readily interchangeable for electric usage. Few changes will be noticed in this line, and these have been made to improve the oil equipment.

Manhattan Screw and Stamping Works, West End avenue and Sixty-seventh street, New York city, will exhibit as a leader the Phoebus gas lamps manufactured by them. in connection with the rest of their line of lamps, tire pumps, generators, etc. The Phoebus lamps are made of two shells, each supporting the other, with all couplings on the inner one. The gas connection at the bottom of the lamp is a swivel, and can be turned to any angle of a circle. Several styles of oil lamps will also be shown.

The Atwood-Castle Company, Amesbury, Mass., will display a complete line of lamps, several of which are new. A new oil side lamp will also be shown, with a combination oil and electric attachment, together with electric head and side lights.

The Badger Brass Company, of Kenosha, Wis., will exhibit their very complete line of acetylene gas lamps and generators, electric side and tail lamps and oil side and tail lamps.

The C. M. Hall Lamp Company, Detroit, Mich., will display a very comprehensive line of automobile lamps, gas headlights, oil side and tail lamps.

### Engines, Clutches, Change Gears.

The Cotta Transmission Company, 250 Mill street, Rockford, Ill., will display samples of their transmissions, together with control levers and parts of the transmissions. The parts will show the construction, material and bearings, as well as give a thorough illustration of the several designs. The list includes selective sliding gear transmissions for shaft and chain drive, pleasure cars and commercial vehicles. The commercial vehicle transmission ranges from light delivery wagons up to and including 5 ton trucks.

The Warner Manufacturing Company, of Toledo, Ohio, will show a line of transmission gears, both planetary and selective sliding, together with differential, spur and bevel gears and pinions, and steering gears; the separate parts of these several models exhibited will illustrate fully the material and the methods of machining.

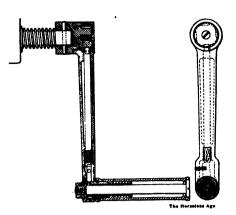
Merchant & Evans Company, Philadelphia, Pa., will display a complete line of their metals, together with products of their mechanical department. The latter include the Hele-Shaw clutch, in all sizes, from 10 to 100 horse power, for pleasure cars and trucks. They will also exhibit the Star pressed steel tire and tool case, on which they have been awarded the exclusive patent rights. This is being produced in two sizes, 34 and 36 inch. The Star baggage carrier for the rear of cars, which, with the Star tire case, makes a complete storage outfit for motor cars, will also be shown, together with their front axle and their new rear axle transmission, complete with brake

The L. A. W. Motor Company, of Providence, R. I., will show a self firing, two cy-

cle, air cooled, six cylinder rotary motor of about 30 horse power. The motor has 2½ inch bore and 2½ inch stroke. On both ends of the wrist pins are D. W. F. ball bearings, which rotate in a perfect circle. The central shaft is offset 1¼ inches from the centre of the circle. The motor is made self firing by each explosion firing the succeeding charge through a small passage in the stationary supply cylinder, the passage being uncovered immediately after the firing of each cylinder. Charge is admitted to the cylinders through a port in the supply cylinder that is uncovered immediately after the exhaust ports have been uncovered.

The Hilton Manufacturing Company, 15 State street, Boston, Mass., will show among other things the Hilton safety starting device for automobile motors, and also a rear starting device for use on motor boats. The device as used on automobiles is all contained in the starting crank, and requires no specially skillful labor to attach to any automobile, as all that is necessary is to remove the old crank and pin the Hilton device in its place. It is claimed that it is impossible to get injured by the motor kicking while cranking with this device.

The Muncie Gear Works, Muncie, Ind., will display a jack shaft and transmission of planetary type suitable for motor trucks of 20 to 35 horse power. It comprises a nickel steel axle and a bevel type differential encased in an oiltight housing, with adjustable ball bearings next to the driving sprockets. The planetary transmission is mounted on adjustable ball bearings. The driving bevel pinion has two rear ball bearings and a plain forward bearing, while the large driven bevel gear is backed up at the



HILTON SAFETY STARTING CRANK.

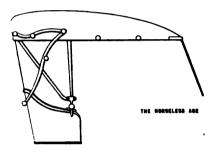
point of contact with a bronze shoe to prevent being forced away from the driving pinion during a heavy pull. The clutch is independent of the transmission and free from end thrust. The special feature of the multiple disc clutch is the toggle joint locking device, which forces the large diameter discs together, giving a strong yet sensitive and smooth action.

The Warner Gear Company, of Muncie, Ind., specialize in transmissions, and will show a new transmission, combined with a multiple disc clutch. Their line of steering gears will also be shown. All their steering devices are of worm and gear type, with stationary spark and throttle controls above the spider. The steering gear is provided with outside adjustment in all directions for taking up wear, and has ball end thrust bearings to eliminate friction and insure easy steering. Rear axle differentials of both the bevel and spur type are also to be exhibited, as well as material specifications for their cover alloy. The transmissions are all of the selective type, with the sliding gears automatically locked in and out of mesh. The new multiple disc transmissions are so arranged that the clutch is mounted in a separate housing. which is cast integral with the transmission case. The clutches are composed of sixtythree discs of heat treated saw blade steel. which revolve in an oil bath.

The Excelsior Motor Manufacturing Company, Chicago, Ill., will exhibit their latest type of motor, which is a four cylinder, water cooled, four cycle, with cylinders cast in pairs, having 41/4 inch bore and 51/8 inch stroke. The principal feature of the motor is its system of lubrication. This is by means of a geared pump attached to the bottom of the crank case, which pumps the oil through copper tubes to the three main bearings, from whence it is carried through the hollow crank shaft to the crank pin bearings, and from there through copper tubes to the piston rod bearings, thus lubricating the piston pin bearings. The water connection pipes are of copper tubing throughout.

Peter A. Frasse & Co., 130 Worth street, New York city, distributors for Shelby steel tubing, will show a line which includes has two lamps elevated to a point just below the line of vision of the driver. The lamp at the right of the driver can be operated to throw the light at either side, or up and down in any angle desired, and reset to its normal position instantly, and can be locked in any position.

The Westchester Appliance Company, 15 Canal place, New York city, will exhibit their line of tops, together with a full line of accessories. Principal among the accessories shown will be the Westchester dry battery. This battery is guaranteed to show twenty-five amperes shelf test three months from the date it leaves the factory. The Westchester storage battery and spark plug will be shown, while the Westchester speedometer will be a new feature added to the list. The display will also include Westchester carbon remover and metal polish.



DUQUESNE RUNABOUT TOP.

The Hill Manufacturing Company, of Buffalo, N. Y., will show a line of automobile tops, bodies, seats, leather trimmings, cushions and backs, and several designs of folding seats, single rumble seats and a wind shield which they have but recently produced. The line of folding auxiliary seats is most complete, comprising many shapes and designs, from the ordinary folding type to the disappearing style.

The Sprague Umbrella Company, Norwalk, Ohio, will exhibit two new wind shields in connection with their otherwise very complete line of this class of goods. One of these is an air cushioned leader wind shield, called Sprague's Special, while the other is an enameled wind shield which has no brass on it. In connection with these will be shown new tops for touring cars and for runabouts made in Duquesne style.

I. C. Chase & Co., 89 Franklin street, Boston. Mass., will display a complete assortment of Auto top fabrics, in all the popular and suitable materials, including mohairs, mackintosh fabrics, worsteds, etc.; also Chase leather in weights adapted to all grades of cars, together with Chase rubber, which is also used for top work on carriages and automobiles.

According to a report from Baltimore, local promoters have secured the old Pimlico race track near that city, and will arrange a number of twenty-four hour races next season. All races will be invitation affairs.

### Oils, Greases, Polishes, Etc.

Valentine & Co., 257 Broadway, New York, will exhibit a full line of Vanadium automobile varnishes, which were first placed on the market early in 1909, and are said to represent the result of several years' effort to produce varnishes specially adapted to the exacting requirements of the automobile trade. These varnishes are claimed to be very full in body, yet easy working and free flowing, and to dry quick and hard. They are said to be not only very brilliant when first applied but to remain so, and to be least affected by mud, grease, oil, etc. This line of Vanadium varnishes also includes a special line of pale goods. The Valentine Company will also exhibit a full line of automobile colors, among the latest being "phenomenal carmine," "fire blue," new maroon and "Hudson" and "Marathon" grays.

George A. Haws, 73 Pine street, New York city, will exhibit a complete line of Panhard oils and greases manufactured by him. A lubricant for every conceivable wearing surface of an automobile has been supplied, and no additions to the line have been made recently, but an effort has been made to make these packages more attractive in appearance and more convenient for handling. The red and white checkerboard design is retained to distinguish this line of lubricants from all others. Panhard cylinder oils of various weights, together with transmission oils and compounds, nonfluid transmission greases, cup grease, graphite grease and cork graphite grease will be shown.

W. P. Miller's Sons, Mott avenue and Hancock street, Long Island City, N. Y., will exhibit their full line of light, medium and extra heavy auto cylinder oils, the last being a grade of Pan-O-Lite. Formerly Pan-O-Lite oil was made only in one weight. The original grade is now known as heavy Pan-O-Lite oil. In connection with these oils will be shown Miller's grease and Excelsior fibrous oil. They will also distribute free of charge 10,000 cartons containing samples of Miller's grease and of Excelsior fibrous oil.

The Connecticut Oil Company, Waterbury, Conn., will show Connecticut brands of Non-Carbon auto oil and special auto greases. They will also make a special display of the J. P. Davies Buckeye auto soap. They will show grades of lard oil, cylinder oils and grease compounds.

Adam Cook's Sons, 313 West street, New York, will have an elaborate exhibit at which they will show the various consistencies of their product, as well as their grease cups. The qualities of "Albany Grease" will be shown by practical demonstration. The soft grades, No. 0 or No. 1, are especially recommended for transmissions containing both slow and fast running parts.

The Keystone Lubricating Company, of Twentieth street and Allegheny avenue, Philadelphia, Pa., have illustrated in a novel manner the qualities of the Keystone oils and greases. A Mitchell chassis will be shown by them the gears of which will be packed with Keystone grease, and will afford a very effective illustration of the action of Keystone grease in use. There will also be exhibited samples of Keystone motor oil. This is a new oil produced by the company, and has been tested by them for the past eighteen months.

The Clover Manufacturing Company, 151 East 126th street, New York city, will show the regular line of Clover grinding compounds, which are put up in two forms for individual use in 4 ounce duplex cans, containing two grades—coarse for roughing and fine for finishing. For the manufacturer it is put up in six grades—I-A (very fine) and A, B, C, D and E (very coarse)—in one pound cans only.

The Havoline Oil Company, 80 Broad street, New York city, will exhibit their full line of oils and greases, including the special Packard lubricants which they manufacture expressly for the Packard Motor Car Company; also a full line of water white gas engine oils which are designated as Havoline Crystal oils.

The Duffy Grease Company, 520 West Fortieth street, New York city, will demonstrate the efficiency of Duffy grease by means of a motor driven automobile transmission. In connection with the grease will be shown several samples of Duffy oils for gasoline motor lubrication.

Moller & Schumann Company, of Marcy and Flushing avenues, Brooklyn, N. Y., makers of varnishes, will exhibit eighteen panels finished with different colored rubbing varnishes and automobile finishes, together with some new wood finishes for the interior of automobiles.

H. T. Alexander & Co., 17 State street, New York, exhibit their line of automobile oils and greases. They have recently changed their trade name from Panhard to Speedway. They will also exhibit automobile soap.

### Slight Increase in Western Freight Rates.

Freight rates on automobiles from the Eastern and Middle Western terminals to the Pacific Coast have been equalized by the Transcontinental Freight Bureau. The new tariff raises the former rate of \$3.50 per 100 pounds to \$4 on carload shipments. On less than carload shipments the old rate of \$7 still prevails. In raising the rate 50 cents the railroads, however, granted the requests of the automobile men that the minimum be reduced from 12,000 to 10,000 pounds per car, where the car used is less than 42 feet long, and when over that and under 50 feet the minimum to be placed at 12,000 pounds. As reported elsewhere in this issue, California dealers have protested against this raise in rates.

### Supply Dealers and Jobbers.

W. F. Polson, of 27 Chenango street, Buffalo, N. Y., will show five styles of wind shields, tire holders and the Polson bumper. The Polson automatic and Model M wind shields are new, and are designed for comfort as well as ease of operation. The automatic shield is simply lifted up to raise and pulled down to lower, there being no nuts, thumb screws or springs to adjust. It is claimed to lock positively in the



THE POLSON WIND SHIELD.

upright position, at 45 degree to 30 degree angle, or folded. The Model M shield is made to fold, with the upper section hung on trunnions in the centre, and can be set at any angle, either forward or back, making a protection for storm or rain, or creating a breeze in the car on a sultry day, but protecting the eyes from dust and wind.

The United Manufacturers, New York. comprise the Weed Chain Tire Grip Company, the New York and New Jersey Lubricants Company, C. A. Metzger, Inc., the Jones Speedometer Company and the Connecticut Telephone and Electric Company. The lines of these various manufacturers are well known and part described by their names. It might be pointed out that C. A. Metzger has recently bought the plant of the Newark Rivet Works, Newark, N. J., and, in addition to his well known automatic wind shield, will exhibit the friction windshield of the Rivet Works. The Connecticut Telephone and Electric Company are specialists in ignition apparatus, manufacturing a line of coils and switches. They have just brought out a new magneto, of which we expect to print a complete description in an early issue, which will be featured at the show. The Weed Chain Tire Grip Company will have an exhibit of their tire chains. The New York and New Jersey Lubricants Company will be on hand with a full line of motor lubricants, and the Jones Speedometer Company will show their several specialties in the line of speedometers, taximeters and electric horns.

The Garage Equipment Manufacturing Company, of Milwaukee, Wis., will show a full line of brass wind shields, known as the Milwaukee Adjustable; also front end buffers, robe rails, foot rests, tire holders, tool grinders, vulcanizers, etc. Among the assortment of automobile parts and specialties will be found a full line of tire chain grips, steering wheel watch case, electric sockets for oil lamps, storage jacks, tire cases, "Evertight" top bow holders, chain bow spring release tool, and other handy articles.

The Wilson Trading Company, 46 Cortlandt street, New York city, will display a representative collection of the sundries handled by them, which covers the field very completely. No effort is made to specialize on any particular line of goods, but many makes of standard goods in accessory lines are handled.

The Allen Auto Specialty Company, 1926 Broadway, New York city, will exhibit their regular line of tire covers, tire holders, tire locks, lamp covers, universal joint and knuckle grease boots. Two new articles will be shown. One is a tire holder for demountable rim tires. This is a double armed device, forming a brace, with a double bracket fitted under the seat, and also on the dash, and holds the tire very rigidly. The other new article is a tire pressure gauge, which can be used in the dark as well as in the light.

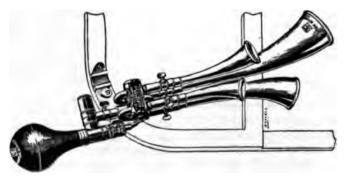
The Standard Leather Washer Manufacturing Company, of 24 Boudinot street, Newark, N. J., will display a full line of Gray's standard touring necessities for 1910. It is the idea of the company to standardize both as to price and quality those articles that are in general use throughout the year. The line at present includes tire

can be easily attached, and is visible at a considerable distance, while at night it can be illuminated by means of a small electric light. The snowshoe can be attached to the wheels of a car without jacking it up, and when not in use can be carried on the running board. The object of the snowshoe is to prevent skidding in sloppy weather.

The Vehicle Apron and Hood Company, of Columbus, Ohio, will exhibit their full line of Gordon motor car supplies, which include tire covers, top hoods, inner patches, headlight and lamp covers, tool rolls, tube cases, cape aprons, auto covers, luggage bags, sleeve protectors, combination lap robes and muffs, and various other water, dust and wind proof articles for comfort and protection.

The Metal Stamping Company, of 50 Hubert street, New York city, will display a complete line of top hardware suitable for automobile tops of all sizes, and in addition to this will show a variety of horns of new patterns; also their regular line of automobile sundries, comprising foot rests, robe rails, tire brackets, wind shields, etc.

Charles E. Miller, 97 Reade street, New York, dealer in parts, fittings, sundries. tools, clothing, American and European novelties for automobiles, motor boats and motorcycles, will show a line covering nearly every need of the motorist, whether owner or driver. Two of the latest articles of foreign origin will be shown. One is the "Testophone," a musical signaling device, which should prove of interest to every motorist, since its tones are very pleasing to the ear, and have resonance enough to command the attention of the most willfully deaf driver on a country road without arousing his ire. The other novelty is a radium watch, in which the hours, the minute and hour hand are



TESTOPHONE SIGNALING DEVICE.

pumps, vulcanizers, tire bands, washers of all kinds and descriptions, metal polish, valve grinding compounds, etc.

Raimes & Co., 50 Ferry street, New York, will exhibit their Globe metal polish, the Erickson gasoline vapor mixer, the Erickson taxicab sign "For Hire" and the Erickson snowshoe for autos. The gasoline vapor mixer can be attached to any carburetor, and is claimed to insure a perfect mixture of air and gasoline gas. The taxicab sign

marked with radium, enabling one to see the time in the darkest night.

The Automobile Supply and Manufacturing Company. Brooklyn, N. Y., will exhibit a line of automobile horns, as well as flexible tubing and flexible shafting for speedometer transmissions. The flexible tubing which is of their own manufacture, will be shown both in the plain and the steel lined forms for all conceivable uses in connection with automobiles, motor boats, etc.

### Miscellaneous Exhibits.

Joseph Tracy, 116 West Thirty-ninth street, New York, shows a fan dynamometer. It consist essentially of a metal standard carrying a horizontal steel shaft in large ball bearings; one end of this shaft is connected to the motor under test by a universally jointed extension shaft; the other end carries an overhung two bladed fan, as shown. On the dynamometer shaft a small pulley, fitted to a boss on the rear of the universal joint, is belted to a larger pulley on the special tachometer, which is mounted on top of the housing that carries the dynamometer shaft. The tachometer has a double scale showing the revolutions per minute and the horse power developed, respectively. The r. p. m. scale is graduated in divisions of twenty revolutions from 200 to 2,000 revolutions. The horse power scale gives a minimum reading of 1 horse power at 480 revolutions, and a maximum reading of 70 horse power at 1,980 revolutions. At all ordinary rates of motor speed a simultaneous reading of r. p. m. and horse power can be obtained without any computation.

The Whitney Manufacturing Company, of Hartford, Conn., will exhibit a very complete line of driving chains and chain belts for automobiles, etc. Also keys and cutters for the Woodruff patent system of keying. In the collection will be seen silent chains, detachable roller chains, detachable bushing chains, block chains, safety connecting links, Presto chucks, collets and friction tapping devices for the rapid change of drills, reamers, counterbores, taps, etc., without stopping the drill press. A special collet for holding shank cutters for cutting Woodruff keyways will be shown. This shows how a cutter may be prevented from turning or slipping endwise in the collet by fitting a No. 2 Whitney key into the shank.

The exhibit of the McCord Manufacturing Company, 2587 Grand Boulevard, Detroit, Mich., will consist of their regular line of radiators, force feed lubricators, radiator fans, circulating pumps, McKim gaskets, etc. One distinct novelty will be a radiator built with a one piece pressed steel frame or shell, instead of the conventional built-up brass frame. This is a new departure in radiator construction and the company expect to build a large share of their radiators during the coming year in this manner. It enables the frame to be finished in baked enamel if it is desired.

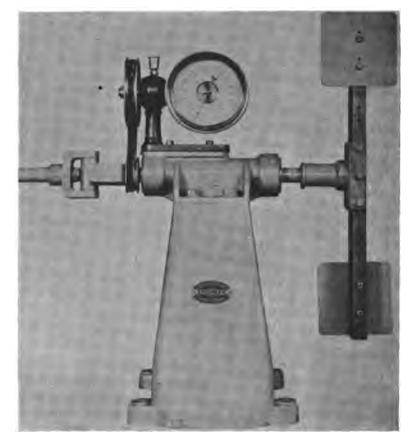
The exhibit of Morrison-Ricker Manufacturing Company, 62 Broad street, Grinnell. Ia., will consist of a large variety of gloves for all seasons. Their "Rist Fit" styles of gloves, mittens and one finger mittens, for cold weather wear, are warmly lined with wool fleece, lamb skin, squirrel, etc. Summer styles are ventilated. Some have short wrists. There will be several new styles of turtleback gauntlets, with strap fasteners or elastic wrists. The stock of

which Grinnell gloves are made is washable. The ventilated and "Rist Fit" remain the leading features.

Spooner & Wells, photographers, of 1931 Broadway, New York, will have a booth surrounded by colored transparencies, backed up with electric lights. The background of the exhibit will be covered with photographs and enlargements, and all the subjects represented in beautiful transparencies. Photographs and enlargements will

mobile contests and tours from the first Glidden and first Vanderbilt Cup race to the corresponding events of the season just past. They will also show photographic enlargements, 8 feet wide, of race accidents and speed pictures.

Fried-Osterman Company, Rockford, Ill., will exhibit their well known line of "Price" gloves, one fingered mittens and mittens. One of the leaders will be a one fingered mitten in pearl washable horsehide, with imported lambskin lining, and black patent leather, extra stiff, wide cuff.



TRACY'S FAN DYNAMOMETER.

be automobiles in various events through the past year, showing many interesting and exciting incidents of track and road contests.

The Y. M. C. A. Automobile School, 318 West Fifty-seventh street. New York, will display pictures, showing how 3.600 men went through their course at the school during the past five years. These 3,600 men have been owners, prospective owners, chauffeurs, and fully one-third of these men have been men who owned their machines. By means of large photographs the shop and toad work of the school will be explained, and also the fact that this is the largest school of its kind in the country. A large aeroplane will also be exhibited, showing the work of the aeronautic class of the West Side Y. M. C. A.

N. Lazarnick, 244 West Forty-second street, New York city, will have an exhibit of protographs and photograph albums, containing views from all the large autoOther gloves are to be seen in reindeer and black washable material, lined and inlined, and black or tan imported Kasan, with imported lamb or rabbit linings.

Rothstein Manufacturing Company, 1941 Park avenue, New York city, will have as a leader a new brass bumper, with no iron parts exposed. They will also show a new style brass tireholder, together with trunk racks, muffler cutouts, valve lifters, lamp brackets, etc.

The Stewart Automobile Academy, of 231 West Fifty-fourth street, New York, will exhibit a sectioned motor, ignition appliances, carburetor, etc.; photographs of their plant, booklets and literature describing fully their courses and methods of instruction, and their equipment.

The National Surety Company, of 115 Broadway, New York, will exhibit their automobile bail bond powers of attorney as usual.

### MAINTENANCE AND REPAIRS.

### Fixtures for Reforming Magneto Cable Ends.

BY C. T. SCHAEFER, C. E.

A handy fixture is shown below, which the writer had occasion to use for reforming the spark plug end of magneto cables used on automobile engines.

Magnetos with cables were bought from one company, and after some time a change was made in the cables and it was found that the new cables were 1-16 inch smaller in diameter, and as a result the terminal for the spark plug end of the cable was too large. Scraping this piece was out of the question, as this would involve considerable delay, which at the time could not be tolerated.

In Fig. 1 is shown the cable end, the diameter A being, as before stated, 1-16 inch too large in diameter. Fig. 2 shows the die for reducing the diameter A. This die

to which a portion of the active material is subjected with each charge and discharge.

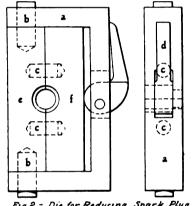
Second—To solution of the set, crystalline lead compounds and precipitation thereof as loose pulverulent compounds. This follows from the formation of concentrated sulphuric acid in the pores of the plates during charge, this dense acid dissolving lead sulphate and reprecipitating it upon contact with the diluted acid at the surface of the plates.

Third—The solution of crystalline lead compounds and reprecipitation as non-crystalline compounds, due to the formation of persulphuric acid at the surface of the positive plates during the gassing period.

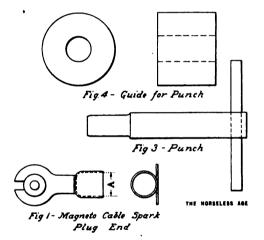
The first source of trouble may be helped in two ways, by less frequent charging and by starting with more thoroughly set .or crystallized plates. It is obvious that with suggested by theory, is: First—To charge at a moderate rate. Second—To recharge only after several partial discharges. Third—To give the gassing charge only occasionally.

These conclusions are fully borne out in practice. The life of batteries is increased by moderate charging, say, the four-hour rate to begin with, and half that rate at the end of the charge. Longer service is secured by infrequent charging. It is not difficult in most installations to defer charging until after several partial discharges, provided these discharges have not stretched over too long a time. A charge following two or three partial discharges on successive days is far better than a charge following each partial discharge.

Fairly complete charges, say, up to 2.4 volts per cell, with the current equal to about half the four-hour rate of discharge, gives longer life to plates than where thorough gassing follows each charge.







was split in order to be able to place the work into it. The part a of the die pivoted on the pins b, which are fastened into the half of the die marked c. The other half was held by the eccentric, which pivoted in a, the pins c locating this half of the die. Fig. 3 shows the punch, and Fig. 4 is a guide for the punch. This work was done by a boy in a small hand press, and the piece trimmed on the end, this being necessitated by the redrawing of the metal.

### The Effect of Frequent and Heavy Charging Upon Pasted Lead Peroxide Plates.

(Paper read by Hugh Rodman before the Society of Automobile Engineers.)

Such plates, in service, and not subjected to abuse, fail by reason of the active mass softening and silting from the face of the plates to the bottom of the jar.

This disintegration is probably due to three causes:

First—An untangling of the set, crystalline mass due to the cycle of changes from peroxide to sulphate and back to peroxide. a battery capacity of 40 miles and a 10-mile run on two successive days, if the charge is deferred until the end of the second run the active mass will have been subjected to one cycle of change of crystallization instead of two cycles, which would have followed recharging after each partial discharge.

The solution of lead compounds by dense sulphuric acid may be partially overcome by the use of thin and porous rather than thick and dense plates, thus giving the sulphuric acid formed during the charge a chance to mix more easily with the dilute, free acid outside the plates. Slow charging will, obviously, serve the same purpose.

The disintegration due to persulphuric acid may be lessened by infrequent, complete gassing charges. It is generally belived that the gassing charge must be given occasionally, but there seems to be no necessity for doing so more than once in, say, two weeks. Certainly it is harmful to gas the plates freely at the end of each charge.

Altogether the best scheme of charging, joolatong, were valued at \$62,000,000.

### A. A. A. Meetings During Madison Square Garden Show Week.

The A. A. A. will have space at both the forthcoming automobile shows in New York. Representatives of the association will be in attendance, and members are invited to make use of the booth, where a telephone will be provided. At the Grand Central Palace Show, headquarters will be at Space 300, and at the Madison Square Garden Show at Space 327 in the Concert Hall. The Automobile Association of London, with which the A. A. A. has reciprocal arrangements, will have a representative in attendance at both booths, and will give information to those contemplating touring abroad.

During the week of the Madison Square Garden Show the following meetings will be held at National Headquarters, 437 Fifth avenue, unless otherwise indicated: Tuesday, January 11, 10 a. m., A. A. A. executive committee monthly meeting, President Lewis R. Speare presiding; Wednesday, January 12, 11 a. m., legislative board. Chairman Charles Thaddeus Terry presiding; Thursday, January 13, 10 a. m., directors' meeting, New York State Automobile Association, President H. A. Meldrum presiding. To be held at Hotel Belmont: Thursday, January 13, 2 p. m., touring information board, Powell Evans, chairman. presiding; Friday, January 14, 10 a. m., second annual reunion A. A. A. State and club secretaries, Frederick H. Elliott, secretary, presiding. Luncheon at 1 o'clock.

During the ten months ending with October, 1909, the importations of India rubber, including Balata gutta percha and guttacolatong, were valued at \$62,000,000.

### THE HORSELESS AGE

Founded in 1895 by E. P. Ingersoll. Every Wednesday.

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### Purchasing Second Hand Cars.

Many articles have appeared in automobile papers and elsewhere on the chief points to be looked out for when examining a second hand car with a view to purchase, and on the demonstrations to be required. It is generally considered that more care is necessary in the selection of a second hand than in that of a new machine, because in the former case the purchaser has to guard against badly abused cars as well as against poorly constructed ones. What wonder that the novice casting about for a used car suitable for his purpose is often shamefully imposed upon!

The prospective purchaser of a used car should certainly look at the machines offered him closely and insist upon a demonstration under severe conditions, but some of the advice that has been offered in regard to the course he should pursue has been very ill considered. We have in mind particularly a recent series of articles in a foreign contemporary in which the

writer advised that the customer should require that the engine and other parts be more or less completely dismounted, so that their working parts could be examined individually, and in case the owner refused to have the car dissected, to break off negotiations at once.

The impracticability of this scheme is well brought out by a communication in the paper referred to, commenting on the advice. The writer says substantially: Suppose I am a business man, working at the office all day, and have a small car for sale. When I come home at 6 o'clock p. m. a prospective customer calls on me and requests that I take the machine apart. I put on a pair of overalls, take my tools and go to work. By 10 o'clock I have succeeded in taking the engine apart, when the prospective purchaser notes that the crank shaft bearings show more or less wear-which is to be expected in a used car-excuses himself on the ground that a car in this state of wear would not do for him, and leaves me with several hours of work before me reassembling the car. The next night I might have to do the work over again for some other "prospect." The nuts and bolts of the car would certainly not be improved by the repeated dismounting and reassembling. For this reason the plan would hardly appeal to an owner even if the prospect should offer to furnish a man to do the work.

The above plainly shows that inspection of individual wearing parts is impossible, and it is, moreover, quite unnecessary. In our estimation the prospective purchaser should subject the car to the following examinations and tests:

- I. Examination of all outward parts for condition or state of wear. Even a novice can readily satisfy himself whether the body and upholstering are in a good state of preservation, whether the tires are still good, whether the axles have sagged materially, whether the wheels are out of true, whether the flywheel wobbles, etc.
- 2. The noise given out by the motor and transmission in operation should be carefully noted, for it is a very good indication of the state of preservation of the internal wearing parts. If the car rattles like a threshing machine it will not only be very unpleasant to drive but will soon be fit for the scrap heap.
- 3. A hill test on a hill, with a maximum gradient of at least 10 or 12 per cent. If the car takes this hill it is proof that the cylinder compression is not materially im-

paired, which is a most important point. It also shows that there is no undue friction in the transmission, owing to binding of the bearings, etc.

4. The above tests should preferably be supplemented by a test run over a distance of 50 to 100 miles. The same objection might be urged against giving such demonstrations as against taking the car apart, as the owner of a car could hardly afford to give such long rides to all who might apply for them without a guarantee of their serious intentions. It would seem a fair solution of this problem to ask the customer demanding such a demonstration to pay a deposit of from \$5 to \$10 to insure his bona fides, which would be refunded in case he bought the car. This plan, we believe, is followed by some dealers, and has undoubtedly even more justification in connection with the sale of privately owned used cars.

### Rattling of the Brake Mechanism.

Among the minor sources of noise in the operation of a motor car is the rattling of various parts of the brake mechanism. It is, however, provocative of considerable annoyance, as the sound is irregular and quite noticeable when rough road surfaces are being traversed. The brake bands and shoes, when released, are in a comparatively loose condition, and unless specially prevented are likely to jar against their drums as the rear axle bounds over road irregularities. Special springs adapted to keep the movable brake parts in a stationary position relatively to their drums, or at least to cushion their vibrations, are provided as a preventive against rattling upon some carefully designed cars—these springs sometimes also acting to insure the clearing of the bands when released.

Other parts of the brake rigging develop a tendency to rattle after wear has advanced seriously. This is true of the joints of the operating linkage, and about the only remedy for this, in addition to providing adequate means of lubrication, is to make the parts adjustable for wear, as is done in steering gear linkage.

Quite often in laying out the brake operating parts and locating the rods and releasing springs not enough clearance is allowed between them and other parts of the car, and the long spiral springs commonly used or the rods themselves strike other parts when the car passes over road irregularities, giving rise to considerable noise of an annoying nature.

The ends of the equalizer bar of one set of brakes are usually guided in a fitting attached to the frame side members, and rattling frequently becomes noticeable at these points. A flat spring is generally provided to hold the equalizer bar ends against one side of the guide, but this arrangement seems to prove inadequate in many instances after a short period of exposure to mud and dust.

Now that the ideal which the public has set is "an absolutely quiet car" rather than a fairly noiseless one, such details as the above assume a degree of importance which they never possessed before.

### Activity in the Commercial Field.

For several years past we have from time to time pointed out the exceptional opportunities in the manufacture of commercial vehicles. Some six months ago it became apparent, from reports current among the trade, that quite a number of the men who had been most prominent in developing the pleasure car industry thought that the proper time to take a more active interest in the commercial vehicle problem had arrived. The growth of this idea is now becoming apparent in the incorporation of quite a number of commercial vehicle companies and the projected formation of many

Coming just now, when even some of the more enthusiastic are wondering how many more makers of pleasure vehicles there is room for, the growth of the commercial end of the industry promises to be doubly beneficial. It is interesting to note that the majority of the new commercial vehicle models are of the smaller type, being either small trucks or delivery wagons. It seems that the demand for this type of machine is even more insistent than that for medium and large sized trucks.

Probably no branch of the business offers better opportunities at present than the formation of companies for the delivery of goods in our larger cities. While a great many trucks and delivery wagons will continue to be operated by individual firms, no one who has given any thought to the subject doubts that the great bulk of commercial work will be done by large companies operating systems of large and small delivery and cartage vehicles over prescribed routes according to regular schedules. It is not unlikely that the growth in this direction will be somewhat similar to the extension of trolley service during the past few years. For while the franchises which have given trolley companies practical monopolies will not be a feature of auto trucking, still considerable capital will be required to install adequate services for cartage and delivery work.

### Automobiles and Leather Prices.

Up to five or six years ago the automobile industry was hardly recognized as a perceptible factor in the general commercial activities of the nation, but during the last year or two its growth has been such that its effect upon other lines of business has become quite marked.

The scarcity of high grade machinists created by their absorption by automobile factories has been commented upon in these columns, and the effect upon the rubber trade occasioned by the enormous production of automobile tires is a matter of rather common knowledge.

In the upholstering of automobiles and in the production of numerous parts and accessories an astonishing amount of leather is required, much of it being of the highest grade. It is safe to say that on the average each car produced has about it as much leather as would be required to keep an ordinary sized family in shoes for one year. Boot and shoe manufacturers are attributing to the very large and rather sudden demands of the automobile industry the shortage of leather, particularly of the best grades, which now exists and which has brought about very high prices. It is rather an interesting if not a very pleasant thought that the colossal development of the automobile industry, which has taken place with such incredible rapidity, has actually affected old and established lines of business which are apparently as far as possible from being related to it, but such is the complicated interrelation of modern commercial activity that the most unexpected reactions of one line upon another are constantly taking place.

### Eliminating Minor Inconveniences.

Minor inconveniences are fast being eliminated from motoring, now that the main problems involved have received at least tentative solution. Oftentimes a petty annoyance, through long sufferance, comes to be accepted until someone who is able to rise above the conventional discovers that it may readily be avoided.

Merely as an example of the means by which trivial but yet annoying inconveniences are being guarded against in recent models may be cited the filling of the gasoline tank. Ordinarily, in order to reach the filling cap of the tank under the front seat, one cushion has to be raised and the seat board lifted, and, when the supply has been replenished, the board and cushion have to be replaced. The left hand cushion of most cars shows wear upon its side edges resulting from being slid in and out whenever gasoline is taken on or the supply on hand is measured. It is perfectly practical to avoid the trouble and wear and tear of disturbing the front seat upholsery by bringing the filler tube up through the upholstered division which separates the two front seats, and this has been done upon at least one recent model. The tank may thus be filled, if care be used, without disturbing the front seat passengers, just as may the tank of a pressure feed system

### Coming Events.

December 25 to January 1-Columbus, Ohio, Automobile Show, Auditorium, Columbus A. C.

December 31 to January 7-New York City An nual Show, Grand Central Palace, American Motor Car Manufacturers' Association.

January 1-Philadelphia, Pa., Roadability Run from Philadelphia to Wilsturn, Century Motor Club. Wilmington, Del., and re-

January 8-15-New York Annual Show, Madison Square Garden, Association of Licensed Automobile Manufacturers.

January 10-16-Portland, Ore., Annual Automobile Show.

January 15-29—Philadelphia, Pa., Show, Second Regiment Armory. Automobile

January 17-22-Kansas City, Mo., Automobile Show, Convention Hall, Motor Car Trade Association.

24-29-Portland, Ore., Automobile Tanuary Show, Armory.

January 24-29-Detroit, Mich., Automobile Show. Wayne Hotel Gardens.

January 24-30-Washington, D. C., Fourth Annual Show, Convention Hall, Automobile Dealers' Association.

February-Grand Forks, N. Dak., Automobile Show

February 4-6-New Orleans, La., Annual Mardi Gras Speed Carnival, New Orleans A. C.

February 5-12-The Ninth Annual National Show at Chicago, Ill., National Association of Automobile Manufacturers February 14-19-Buffalo, N. Y., Automobile

Show, Broadway Arsenal, A. C. of Buffalo and Buffalo Automobile Trade Association. February 14-19-Hartford, Conn., Automobile

Show, Foot Guard Hall, Hartford Automobile Dealers' Association. February 14-21-St. Louis, Mo., Annual Auto-

mobile Show, National Guard Armory.

February 19-26—Newark, N. J., Automobile Show, Essex Troop Armory.

February 19-26-Salt Lake City, Utah, Automobile Show, Auditorium.

February 21-26-Binghamton, N. Y., Automobile Show, State Armory.

February 21-26-Minneapolis, Minn., Automobile Show, National Guard Armory.

February 21-26-Cincinnati, Ohio, Automobile Show, A. C. of Cincinnati.

February 21-27-Cleveland, Ohio, Show, Central Armory, Cleveland Automobile Association.

February 22-27-Milwaukee, Wis., Automobile Show, Auditorium, Milwaukee A. C.

### GREAT QUESTIONS OF AUTOMOBILE ENGINEERING.

### Right Hand versus Left Hand Control for Automobiles.

BY W. F. DAVIDSON.

The desirability of standardization of control in automobiles is becoming more apparent now that so many prominent manufacturers have adopted the left hand control for their 1910 models, and in this article the writer will attempt to set forth the chief arguments for and against the different controls, viz., right hand and left hand, and discuss each in the light of his experience and the experience of others.

The advantages and disadvantages of the two controls may be divided into general and purely mechanical, the first division being by far the largest. The advantages and disadvantages of one are, moreover, usually the disadvantages and advantages of the other, so the question may be discussed by considering the claims for and against the left hand control.

The general points brought forth by the advocates of the left hand control are: I. Greater ease in getting in and out of the front seat from the right side of the car. 2. The bringing of the drivers of meeting vehicles next each other, thus lessening the danger of collision.

#### EASE OF INGRESS AND EGRESS.

We will now proceed to examine these points. The first point, that of greater ease in getting in and out of the front seat, is of great importance as regards the convenience of both driver and passenger, especially where the traffic regulations require a vehicle to stop with its right side to the curb, as is now required in most large cities. As is well known, it is very hard, if not almost impossible, to get in or out of the front seat on the driver's side of most cars, even when the control levers are especially arranged to permit it. But it still remains that with the right hand control the passenger on the front seat, and usually the driver, has to get out of the car on the left side and walk around, often in the mud, which is not at all agreeable, nor consistent with the general comforts of modern motoring. The left hand control obviously remedies this fault and scores a great point in its favor. The second point, that it brings the drivers of meeting vehicles together, so that they are able to judge with greater certainty the distance between the vehicles. thus lessening the danger of collision, is well worth consideration, as when two vehicles meet on a narrow road, as often happens in touring, the distance between the two must be judged with great nicety in order to prevent scraping of the mud guards or otherwise damaging the cars.

The objections brought up against the left hand control are, in general: 1. The difficulty of judging the distance from the curb. 2. Difficulty of operating the levers.

3. The difficulty of judging the distance of an overtaken vehicle.

#### JUDGING CURB DISTANCE.

As to the truth of the first claim, there seems to be great difference of opinion, some drivers maintaining that it is more difficult to judge the curb distance with the left hand control, and others that it is no more difficult with one than with the other. However that may be, one thing is certain, that if the curb distance is not properly judged the tires are usually badly damaged, not to mention the damage resulting from undue straining of the wheels and axles, and especially the steering knuckles. Even with the present prevailing right hand control one may see cars in any large city on which the sides of the tires have been badly damaged by cutting on the curb, and if the left hand control increases this the results would prove expensive to the owner.

#### LEFT HAND OPERATION.

The point against the left hand control usually given greatest importance is the difficulty of operating the levers with the left hand. Although, as has often been urged, these operations are comparatively simple and quite easily learned by any one, still this does not appear to cover the difficulty, because a great many people will handle a lever all right with their left hand under ordinary conditions of driving, but in an emergency requiring quick action will reach for a right hand lever, and finding none, will remember that the lever is on the other side and that they must change, by which time the accident which might otherwise have been avoided may have happened. The writer had an experience very much like that recently, although the accident was avoided; he was driving on a rarrow country road when a wagon came out onto the road without any notice. and it was necessary to stop very quickly. Not wishing to trust entirely to the foot brake he reached for the hand brake lever with his right hand, but it was not there and the car had fortunately come to a stop before any damage was done. Such things would probably become less frequent if the left hand control were used entirely, but even then the average man is too right handed not to have some tendency to do such things in an emergency when they are most to be avoided.

### CENTRE CONTROL.

Several designers, recognizing this difficulty, have sought to overcome it by putting the levers on the driver's right side; in other words, by putting them between the two front seats, but the disadvantages of this arrangement seem almost as great as those it is attempted to overcome. In the first place it is rather difficult to arrange the levers, especially the brake lever, so that the driver's arm will have a free chance to move in operating them. The great disadvantage of this is apparent to any one who has driven any of the older models, on which it was often necessary to reach around several corners to get the desired lever. Robes, luggage, or the passenger on the front seat are all apt to get in the driver's way. There are advantages, however, which this arrangement of the levers gives, for it is then possible for the passenger on the front seat to assist the driver, although the writer's experience with this type of control has been unsatisfactory, and he believes it even dangerous, as it gives an opportunity to "grab the reins."

#### OVERTAKING VEHICLES.

The next point against the left hand control is the difficulty of judging the distance of an overtaken vehicle, as, according to the present rule of "pass to the left," the driver would be on the side farthest from the overtaken vehicle. As the left hand control brings the drivers of meeting vehicles next each other that would seem an advantage to offset this disadvantage, but a closer study of the question seems to point in favor of the right hand control, for in the case of meeting vehicles there are two drivers watching and able to judge the distance between the cars, while in the case of the overtaking vehicle there is only one who can well judge the distance, and as this places double responsibility on him it seems as if he should be given the most advantageous position, namely, on the right side of his car.

#### MECHANICAL POINTS.

We now come to the mechanical points in favor of the left hand control. There is only about one point under this heading, and it is that in the right hand control there is considerably greater strain on the right hand springs than on the left hand springs, which may be almost entirely overcome by using the left hand control. These strains arise, first, from the weight of the driver on the right hand side of the car when he is driving alone, as is done a large part of the time the average automobile is in use; second, from the strain due to the tilting effect of the body when the car is running on the right side of a somewhat rounded roadway; another condition which very often exists in average driving, and, last, from the strains due to the torque of the motor, which tends to depress the right hand springs. It is impossible to calculate the first two with any accuracy for general conditions, but calculations of the last show that a motor developing 20 horse power, at 1,000 r. p. m., and mounted in a frame with springs 40 inches apart, will cause a difference in the loads on the right and left

springs of 63 pounds. Of course, this may be counteracted by reversing the direction of rotation of the motor, as some manufacturers have done, although whether this is the reason for it or not the writer is unable to state. The advocates of the left hand control would overcome this objection to the right hand control by putting the driver on the left hand side, in that way securing the other advantages of that kind of control, and at the same time overcoming the unequal strains on the springs, which is very desirable, yet this does not seem to the writer to be a very strong argument, as the same, or nearly the same, result could be obtained by reversing the direction of rotation of the motor, as before noted, should the general advantages of the right hand control appear greater than those of the left hand.

### Power Absorption by Gear Box Lubricants.

I have always held that the use of a very viscous lubricant in the gear box is madvisable, as it must absorb considerable power in resisting the passage of the moving parts, and lately I carried out a series of experiments to ascertain the varying amounts of power absorbed in accordance with the viscosity of the lubricant, and with the extent to which the gear box is filled.

An up to date gear box from a 15 horse power car of well known make was used. It had a total capacity of 3½ gallons, while 2 gallons of oil just sufficed to cover the shafts. This gear box was coupled up by a flexible coupling to an electric motor provided with the necessary measuring instruments.

In all the experiments the second gear was in mesh.

The speed of the main shaft was 1,100 r. p. m.

Readings were taken every ten min-

Each test was run until the temperature became constant.

In the first place the gear box was well lubricated, and then run empty to ascertain the amount of power required to drive the motor and the gear box, and from this was obtained a basis for comparison, as, knowing this constant, all additional absorption of power must be due to the churning action of the gears in the lubricant, or rather to the resistance of the lubricant, in a confined space, to the passage of the gears and other moving parts.

The tables show the figures obtained, and the study of these may be of interest. I will only draw attention to one or two points. The difference between running the gear box dry and running it with only one quart of oil (so that the teeth just dipped into the oil) was practically nil, but as the box was filled up to the shaft almost another horse power was absorbed. With

the box absolutely filled with this oil there was further loss of power. It will be noticed that when greases were employed the absorption of power at once jumped up, as did also the temperature. In the case of one well known grease, which is stated to increase the power and cling to the gears, the worst results were obtained. The makers evidently consider that such adhesiveness is a point in its favor. With the ordinary and less sticky type of yellow motor grease the results were somewhat better.

Taking the extreme cases, it will be noticed that the absorption of power by the lubricant in the box varies from 0.51 to 2.9 horse power. Therefore it seems advisable that motorists, and especially those that have cars of comparatively small power, should be very careful that the minimum amount of power be absorbed uselessly thus. Taking the case of the man with a car of 10 to 15 horse power, it is quite easy for him to expend 10 per cent. of the power in churning up a heavy grease.

I think the tests show that the use of any form of solid lubricant is wasteful of power, and that the same remark also applies to the use of an excessive quantity.

The difficulty of keeping a thin lubricant in the gear box is no doubt serious, and manufacturers do not seem to pay sufficient attention to the question. The system frequently adopted of using felt or fibrous packing is bad, because, firstly, if no means be used for compressing it on the shaft it soon becomes inoperative, and secondly, if an adjustable gland be provided, and is tightened sufficiently to keep in the oil, a remarkable amount of friction is introduced. and consequently power absorbed. The method which might be adopted more generally is that used on all electrical plant and high speed steam engines, and on some petrol motors, viz., the provision on the shaft for a V thrower ring, and a catch box draining back into the gear box.

The other objection to a thin lubricant is that it will not deaden the noise, and, of course, if the gears are badly cut and out of line this is sure to be excessive. But these are exceptions today, and nearly all one's driving, even on small powered cars, is done on top gear with direct drive, and with no wheels in mesh. If more noise results from the small quantity of comparatively thin lubricant I strap a piece of thick saddler's felt round the gear box to deaden it

11.			
(A)—Box	empty, but	well lubricated	d.
н. Р.	Fabr.	H. P.	Fahr.
Absorbed.	Temp.	Absorbed.	Temp.
0.7	48.0	0.7	53 - 5
(B)—Box	contained	r quart of ligh	nt bodied oil.
Teeth just d	lipping.		
H. P.	Fahr.	H. P.	Fahr.
Absorbed.	Temp.	Absorbed.	Temp.
0.63	50.0	0.51	55.5
(C)—Box	contained	2 gallons of	light bodied
oil.			
H. P.	Fahr.	Н. Р.	Fahr.
Absorbed.	Temp.	Absorbed.	Temp.
1.15	48.0	1.02	64.0
1.08	58.0	0.92	75.5

62.0

1.02

(D)—Box ied oil.	contained 2	gallons of m	edium bod-
H. P.	Fahr.	Н. Р.	Fahr.
Absorbed.	Temp.	Absorbed.	Temp.
1.4	50.0	1.12	94.0
1.27	75.5	1.09	99.0
1.15	88.0		
(E)—Box	filled right	up and test	(D) con-
tinued.		-	
H. P.	Fahr.	H. P.	Fahr.
Absorbed.	Temp.	Absorbed.	Temp.
1.2	94.0	1.15	104.0
1.17	99 - 5	•	
(F)—Box	contained 2	gallons ordin	nary yellow
motor grease.	•	_	•
H. P.	Fabr.	н. Р.	Fahr.
Absorbed.	Temp.	Absorbed.	Temp.
1.75	52.0	I.20	102.0
1.26	84.0	1.29	108.0
(G)—Cont	ained 2 gallo	ns of a great	se stated to
"increase pov	ver," and als	o to cling.	
H. P.	Fahr.	H. P.	Fahr.
Absorbed.	Temp.	Absorbed.	Temp.
2.9	78.0	1.44	110.0
1.78	94 - 5	1.4	114.0
1.5	104.0	1.38	122.5
(H)—Box	filled right	up and test	(G) con-
tinued.			
н. Р.	Fahr.	H. P.	Fahr.
Absorbed.	Temp.	Absorbed.	Temp.
1.52	117.0	1.5	131.0
1.5	127.0		
-Alexande	r Duckham	in the Au	tocar.

### To Manufacture Aeroplanes in Indianapolis.

A company for the manufacture of aeroplanes is being organized in Indianapolis. and it will be incorporated within a short time, with an authorized capitalization of \$100,000. Carl G. Fisher, president of the Indianapolis Motor Speedway, who is also identified with the Fisher Automobile Company, the Empire Motor Car Company and the Prest-O-Lite Company, will be one of the principal stockholders. A factory will be established on the third floor of the building of the Fisher Automobile Company. A concern for the manufacture of aeroplane engines is also being formed by Mr. Fisher, A. C. Newby, of the National Motor Vehicle Company; F. H. Wheeler, of Wheeler & Schebler; J. A. Allison, of the Prest-O-Lite Company; Howard Marmon, of the Nordyke & Marmon Company; W. G. Wall, of the National Motor Vehicle Company, and E. A. Moross, of the Indianapolis Motor Speedway.

### Indianapolis to Have Show.

Plans are under way for the annual automobile show which will be held in Indianapolis some time in March. As a preliminary step, the Indianapolis Automobile Trade Association has reorganized with the following officers: President, Fred I. Willis, of the Hearsey-Willis Company; treasurer, Frank L. Moore, of the Fisher Automobile Company, and secretary, Frank B. Willis, of the Willis-Holcomb Company. As usual, each dealer will exhibit in his own salesroom, but there will be a street parade, and the week will close with a trade banquet at a hotel.

### Clutch Slipping; Its Purposes and Effects.

By Albert L. Clough.

Accustomed as every automobile operator is to the practice of slipping the clutch, it is not every one who stops to think just what happens upon these occasions.

Clutch slipping is commonly resorted to for three purposes: (1) To aid in the acceleration of the car from a state of rest. (2) To reduce vehicle speed below that at which the motor will drive it, with closed throttle and late spark, without changing to a lower gear. (3) To help the car over the crest of a hill or through some short stretch of difficult going.

A clutch which engages progressively may be regarded as a crude form of frictional transmission, possessing an efficiency of nearly 100 per cent. when it is in positive engagement and of 0 per cent. when it is entirely out of engagement, with efficiencies decreasing somewhat progressively from 100 per cent. to 0 per cent. as the slip increases from nothing to totality.

When the clutch is in contact, but not sufficiently engaged to start its car or to keep it in motion, its efficiency is also zero, and the energy in foot pounds per minute which it is absorbing from the motor is equal to the frictional torque in pounds existing betwen the two clutch members at their mean radius, times the peripheral speed of the engine driven member in feet per minute at this radius. This energy is dissipated as heat at the contact surfaces. When the clutch is engaged sufficiently to accelerate the car on the level, but is at the same time slipping, the efficiency of transmission is greater than zero, the output of the motor at any instant, minus the input called for at that instant, to effect the acceleration of the car (and to overcome the instantaneous tractive resistance) being the rate of dissipation of energy at the clutch surfaces in the form of heat. If the car is in motion, on the level, but at a speed less than that at which the instantaneous speed of the motor would drive it, if fully clutched in, the difference between motor output and the input received by the car to overcome traction resistances represents the input which is converted into heat at the clutch.

#### IN STARTING.

(1) When a car is to be gently started from rest, on the level, the motor is usually speeded up to perhaps 500 or more r. p. m., and the clutch is very lightly engaged, when the car starts into very slow motion. At the same instant the throttle is opened somewhat—enough to keep up the speed of the motor and simultaneously the clutch is allowed to engage a little more positively. This further increases the car speed relatively to that of the engine, and, by degrees, the car and motor approach and finally attain corresponding speeds, at which time the clutch is in full engagement. After this the throttle opening may be re-

duced from that which prevailed during the period of acceleration, and the car will still move at the speed to which it has been accelerated.

Before the clutch is engaged at all, but after the motor has been speeded, the latter is delivering no output, all the mechanical energy developed being dissipated in engine friction. The balance wheel, however, possesses a certain amount of energy. If the clutch is lightly engaged, without opening the throttle, the motor will slow down, and at its reduced speed does a small amount of external work, a part of the energy formerly consumed in its own friction be-, ing usefully available, since piston and other frictional losses decrease with decreasing speed. Even though the motor furnishes but a horse power or so, the car, if on a level, smooth surface, can be started by very careful letting in of the clutch without further engine speeding. If the car will start from rest at all without stalling the motor it can usually be brought up to the speed corresponding to that of the motor previous to clutch engagement. At the first of the car motion there is a very large discrepancy between the car and engine speeds; the efficiency of the clutch as a transmission device is very low, and very little energy is applied to the car. With each increment of car speed, however, the transmissive efficiency of the clutch increases and a greater proportion of the available output of the motor is applied to moving the car, and less is wasted as heat at the clutch, so that the nearer car and engine speed coincide the more rapid is the tendency for them to come into complete coincidence, and the more rapidly the clutch may be let in.

As in many other instances, "it is the first step that costs."

If the throttle is opened as soon as the clutch begins to engage the turning power will be proportionally greater and the clutch may be let in proportionally more rapidly without danger of reducing motor speed to the stalling point.

When, during the operation of starting, matters are so regulated that the engine speed hardly changes from the time the clutch has just been touched in and that at which engine and car are at corresponding speeds, the stored energy in the balance wheel obviously plays no great part. Of course, at the moment of contacting the clutch there is quite a decrease in engine speed, and the flywheel energy represented by this speed reduction goes to assist in the initial movement of the car very helpfully, as the clutch is then working most inefficiently as a transmission device.

On the contrary, in all cases in which the clutch is let in suddenly the energy in the balance wheel is the main factor. Under these conditions the motor must be speeded very high before engagement takes place. The time elapsing before the motor and car arrive at corresponding speeds is exceedingly brief under these circumstances, and the actual output of the motor during this time is a very small factor as contributing to the energy effective during the period. If the initial speed of the engine is great enough, the energy in the flywheel will be sufficient to accelerate the car before complete engagement occurs to such a speed that at the engine speed corresponding thereto the next compression period can be passed by the motor and stalling be prevented. Should the degree of speeding be less, with the same rapidity of clutch engagement, the engine will stall. Such a start as this is accompanied by a terrific jerk, labored operation of the motor for a moment thereafter (or stalling) and fearful stresses upon all parts, the balance wheel "trying," as it were, to twist itself free from the crank shaft while giving up its stored energy. When running at 1,200 revolutions per minute the energy stored in the flywheel of the average four cylinder motor of 4 inch bore may be taken as at least 10,000 foot pounds, which represents the expenditure of 18 horse power for one

Briefly, the philosophy of clutch slipping at starting is as follows: Such slippage is for the purpose of prolonging the period of acceleration by dividing the speed increase into small increments, each one of which increments is effected by the output of the motor within the time in which the increment takes place. Succeeding increments of speed involve less call for energy from the motor as the clutch efficiency increases with the approach to coincidence between the motor and the car.

#### IN SLOW DRIVING.

(2) Considering now the second occasion for clutch slipping, that of securing a vehicle speed less than that otherwise obtainable with the motor at its lowest practicable rate of rotation, it may be remarked that every automobile engine has a minimum operative speed below which it cannot be made to operate regularly. This is dependent mainly upon the amount of balance wheel capacity provided in proportion to other factors, such as the compression used. The action of the engine becomes jerky and labored below the above mentioned speed limit. Sometimes the minimum engine speed is fixed not by mechanical considerations, but by the carburetor arrangements preventing the regular formation of an explosive mixture at lower speeds, or by the inability of the magneto to generate reliable sparks at lower rates of rotation. It is safe to say that very few four cylinder cars as ordinarily geared can be slowed down to less than, say, 6 miles per hour on the direct drive, even on

smooth, level going, and for a good many such cars 8 or 9 miles is the limit. If it becomes necessary in traffic or under some other circumstances to run slower than this, either a change of gear or slipping of the clutch has to be resorted to.

The average operator has a deep seated aversion to changing gears, especially for short periods, and therefore lowers his speed by slipping the clutch. If car speed is to be reduced but a little below that at which the engine would carry the car if positively clutched in; that is, if only a slight degree of slip is required, clutch slipping works out very well, as the efficiency of transmission of the clutch is relatively good and a fair share of motor output is usefully applied to the car. If, on the other hand, the car speed is reduced nearly to nothing it is very difficult to pick it up again on account of the inefficiency of the clutch, without excessive speeding of the motor. It is the common experience of every motorist that he must resort to a lower gear if the car speed falls very far below that of the motor, but that slight reductions of speed are readily "picked up" without much motor acceleration being needed.

#### DANGER FROM HEATING.

When it comes to slipping the clutch for considerable periods of time under heavy load, the question of the danger from heat there developed forcibly obtrudes itself. The heat developed is independent of the type of clutch used, and depends upon the output of the engine and the degree of slip. The temperatures of the engaging parts of the clutch thus depend upon the rate at which they can get rid of the heat developed, and the liability of damage by heat depends upon temperature and the nature of the materials affected by it. The use for one of the clutch faces of a poorly conductive material, like leather, the structure of which is rapidly broken down by exposure to a high temperature, closely limits the amount of permissible clutch slipping. The use of an asbestos metal gauze combination for the clutch face permits of more slipping without harmful results, as the material is much more highly heat resisting, although about the same as to conductivity. Clutches with all metal engaging surfaces are comparatively free conductors, and dissipate the heat engendered rather rapidly, and the surfaces are unaffected by ordinary temperatures so long as lubrication remains effective. Such clutches, as a rule, whether of the multiple disc or other types, will stand for a considerable amount of slippage, as compared with clutches lined with organic material.

### IN HILL CLIMBING.

(3) The third condition under which clutch slipping is practiced is in hill climbing. When climbing a grade, on the high gear, the motor may slow down to the point at which its action becomes irregular and labored. Assuming, as one may do without very serious error, that engine torque is constant through a wide range of speed, engine output is in proportion

to speed, and at the lowest practicable speed of a motor, at full throttle, its output is very small, perhaps not more than one-fifth its maximum.

The horse power required to take the car up the hill is very nearly in proportion to the speed of the ascent, and, at the rather low speed corresponding with the minimum practicable speed of the motor, is not so great as might be supposed—one may say, in order to have some concrete estimate, a quarter of the full engine output. The trouble is that the heavy torque resistance imposed upon the motor slows it down to such a low speed that its output becomes very low.

If now the clutch is partially released the engine speeds up very substantially under the reduced torque resistance, and its output increases, roughly, in proportion to its increased speed. There is, of course, a large waste of energy at the slipping faces of the clutch, which loss is in proportion to the engine power developed and the percentage of slip, but it may happen that, if the engine and car speeds are not too far out of coincidence, the increased engine outout more than equals the loss of energy in the clutch, in which event the car pulls over the hill upon which it would have stalled had the clutch been kept in full engagement.

Operators who are demonstrating the hill climbing capability of cars to rather uncritical intending purchasers frequently resort to clutch slipping as described above.

"JOCKEYING."

Frequently in clutch slipping, when the operator is endeavoring to coax his car over a hill crest, a close succession of clutch releases and engagements is made use of. When the clutch is released the engine speeds up to nearly its maximum rate before the car has lost much headway, and the energy developed by the motor during these bursts of speed is stored in the balance wheel and becomes available to accelerate the car as soon as engagement occurs. The resort to this method is rather hard upon all parts of the mechanism, and cannot be recommended as a regular practice, especially if the clutch is not one which will take care of a large amount of frictionally developed heat.

### Indiana Road Work Held Up.

A rehearing in gravel road cases has been granted by the Indiana Supreme Court. It was in these cases that the road laws, which provided for the construction of roads by bond issues, which in turn were to be paid by taxation, were declared unconstitutional. Judge Jordan, who wrote the original opinion, was the only judge dissenting from the decision for a rehearing. He said: "I perceive no sufficient reasons for granting the rehearing in this appeal. Viewed from any standpoint, the statute in question, in my opinion, is unconstitutional. I, therefore, vote against granting the petition for rehearing." It is expected that another opinion on the road laws will be made early next year. As a result of the recent decision, holding the laws unconstitutional, about \$2,000,000 worth of work under way has been suspended.

#### How the Klaxon Originated.

The signalling requirements of motor traffic have led to the invention of an entirely new noise device—the Klaxon. The horn, the bell and even the siren were known long before the advent of the automobile, and were only adapted to the new use, while the Klaxon represents an entirely new type of signalling device.

It was by analysis that Miller Reese Hutchison, the inventor of the Acousticon for the deaf, developed the Klaxon. Realizing the limitations of existing signals, he set himself the task of devising one which should make many times the noise of a horn, and yet be free from both complication and tone variation.

Evidently a source of energy was needed. First he tried an electric horn. It had a soft iron diaphragm and an electro magnet. The diaphragm acted as a vibrating armature, on the principle of the electric buzzer. It produced a note of fair volume, but the platinum contacts burned away too fast. Next, he tried a larger diaphragm and friction drive. A lobed wheel, driven by a flexible shaft, ran against a hardened steel button in the centre of the diaphragm. The resulting noise was diabolical, a deafening uproar of harsh metallic quality, unlike any other sound ever heard by man. As a warning signal it was a complete success: but it was too violent, and, besides, there was the troublesome friction wheel. bracket and flexible shaft to be specially installed.

Then the question arose: since power must be used, why not have an electric motor? The electric motor is far more efficient as a converter of current into work than any sort of electro magnetic buzzer, and it does not break the circuit several hundred times a second like the latter.

A miniature motor was made on the lines of best power practice. A toothed wheel was keyed on the shaft. Everything was made practically non-wearing, and suitable protection from water was added. A projector was made of such shape as to spread the sound waves laterally while sending them ahead. The completed apparatus, after many tests and refinements, was the Klaxon of today, not so loud as the flywheel Klaxon, but claimed by its inventor to be the most efficient converter of power into continuous noise.

The peculiar metallic note is said to be due to the diaphragm being very slightly buckled, like the bottom of an oil can. The amount of this buckling is very carefully regulated, and it results in each individual vibration having a sort of explosive crack. The motor runs at 3,000 r. p. m. on a 6 volt storage battery, and produces 500 complete vibrations per second. To resist breakage the diaphragm is specially rolled of chrome-vanadium steel.

### A Review of the 1909 Contest Season.

By M. Worth Colwell.

While opinions of manufacturers differ somewhat as to whether or not the game is worth the candle, the fact remains that contests, either of the speed or reliability variety, are instructive. While one manufacturer may not enter his own cars in contests, he nevertheless watches the points wherein his competitors in the industry fall down, and profits accordingly when he begins to design new models. A glance at the registration lists of a few of the larger States will show that it is the makers who enter contests, as a rule, who sell the most cars. Companies who maintain regular racing stables and keep their drivers on an active campaign throughout the country and advertise their product to a suitable extent find difficulty from time to time in supplying the demand for cars. A number of these companies have formed the Manufacturers' Contest Association, which on January I will take active control of all contests, speed and otherwise, having a working agreement with the contest board of the American Automobile Association, and from the calibre of the men representing leading manufacturers and importers in this association it is safe to assume that contests in 1910, and for some time to come, will be run on a safe and sane basis.

1909 has been a most satisfactory year, as far as contests are concerned, with the exception that it was a big disappointment not to have a second running of the Grand Prize race, and also that the Vanderbilt Cup race—what was to be the crowning event of 1909—was such an uninteresting contest. One or two road records were made during the year, notably that of 69.6 miles an hour by Louis Chevrolet at Riverhead, while track records galore were smashed. All the former marks for I mile tracks were broken. The year also produced a novelty in specially constructed motordromes at Indianapolis and Atlanta. Nothing like these had ever been attempted on this side of the water. Records flew at Indianapolis, only to be greatly reduced when the Atlanta opening came. Racing abroad amounted to little or nothing, owing principally to the fact that the French manufacturers formed a pact to kill the Grand Prix event—the great European classic. The foreigners felt that the game was too expensive.

#### NEW ORLEANS HAD FIRST EVENT.

Racing at New Orleans, La., began the contest season in this country on February 21, when at a three days' track meet Ralph De Palma, in the Fiat "Cyclone," monopolized the honors by winning seven events and setting up a new 10 mile record of 9:11 2-5, which he later beat materially at St. Paul. Robert Burman at the wheel of a Buick made a new 100 mile mark of 1:42:39 2-5. At this meet Mrs. Joan Newton Cuneo, in competition with all the crack

drivers, made a remarkable showing, winning several races. This, by the way, was her last public appearance in speed contests, owing to the decision of the A. A. A. barring women drivers.

The next month the annual Ormond-Daytona meet took place, and while there were but few entries a new world's straightaway mark was made. George Robertson, in Hugh McIntosh's 120 horse power Benz, was the start, breaking the 5 mile figure when he covered that distance in 2 minutes 45 1-5 seconds. David Bruce-Brown, in the same car, won the Sir Thomas Dewar trophy when he covered a mile in 33 seconds flat. De Palma set up a new 120 mile record of 1:33:44, and permanently won the Minneapolis trophy. The Daytona event, however, did not evoke the enthusiasm or draw the crowds that it did some four years ago

Owing to a disagreement among the members of the Briarcliff race committee regarding the size of cylinder, bore and stroke, there was no contest over the Westchester County course this year. In fact there was no spring race of importance except the Pacific Coast event at Santa Rosa, Cal., which Ben Noonan won in fast time in a Stoddard-Dayton.

#### NEW YORK-SEATTLE RACE.

That rather peculiar and somewhat lengthy and unpopular New York-Seattle race, which was run without the approval of the Manufacturers' Contest Association, although sanctioned by the Automobile Club of America, started on June 1, at New York, with only five entries. Eventually the affair wound up with a protested victory for the Ford, driven by W. B. Scott—a victory which was later awarded to the Shawmut entry after an investigation.

Numerous small track meets were held in the spring, among which was one which produced a new world's 25 mile record for mile tracks. This was at Readville, Mass., and De Palma was the record breaker, clipping Barney Oldfield's mark materially in 23:35—a mark which De Palma again broke in the fall.

#### THE WESTERN STOCK CHASSIS RACE

for the Cobe trophy was being looked forward to about this season. It was widely heralded in the newspapers, and a vigorous publicity campaign was engineered to centre interest in it. Sad to relate, the race held June 19 turned out a financial loss, and there is considerable doubt whether it will be held over the Crown Point-Lowell course in Indiana, under the auspices of the Chicago Automobile Club, again. The Cobe trophy was won by Louis Chevrolet in a Buick car at the slow average speed of 49.9 miles an hour. The late William Bourque, in a Knox, was second, and Robertson, in a Locomobile, third. This con-

test was most unsatisfactory, in that so many of the competitors broke down and dropped out long before the finish line was crossed. The light car contest for the Indiana trophy, held the previous day, resulted in a victory for Joe Matson, in a Chalmers-Detroit—the first good race this driver was fortunate enough to win. He was closely pushed for first place by George Robertson, in a 20 horse power Locomobile, at a 50 mile an hour clip.

A June road race that interested the people of Portland, Ore., was that for the Wemme Cup, which was captured by Bert Dingley, in a Chalmers, at a rate of nearly 60 miles an hour. Two of the light car classes in this contest were won by H. M. Covey, in a Cadillac, and C. Arnold, in a Pope-Hartford, respectively. A few days later another Western speed event was that on a road course in Denver, Col. A Colburn car was the first to cover the 290 miles, piloted by E. McMillan, at the very slow average of 33 miles an hour.

The first of a series of twenty-four hour races was run off at Brighton Beach on July 30-31, and was won by George Robertson and Al. Poole, in a 50 horse power Simplex, covering 1,091 miles, but failing to equal the record then held by Robertson in the same car. Louis Disbrow, in a Rainier, ran a good second.

#### INDIANAPOLIS SPEEDWAY INAUGURAL MEET.

In August came the inagural of the brand new Indianapolis Motor Speedway. It is to be greatly regretted that this initial meet should have been marred by several fatalities, for numerous new American records for a specially built 21/4 mile course were set up. It was the rough condition of the unfinished track surface rather than any radical fault with the banking or designing that caused turtling of cars. Three days of racing, beginning August 19, saw some remarkably fast time, among the best marks being Oldfield's mile in 43 1-10 seconds, a new American figure for the mile on that sort of a course. Louis Strang covered a fast 100 miles, winning the event in 1:32:48. E. A. Hearne, in a Fiat, won the 10 mile amateur championship in 9:44 3-10; Len Zengel made a new 10 mile mark of 8:23 1-5 with a Chadwick, and numerous other fast times were recorded, nearly all of which were exceeded in the fall at Atlanta. While many of these figures were announced at the time as being "world's" records, they were not by a long margin, for the figures came nowhere near the speeds made at Brooklands, England.

### LOWELL RACE.

When the National Stock Chassis Competition was run at Lowell, Mass., on September 6-8, the people who flocked to the Textile City saw one of the most exciting, hotly contested road races ever driven in a big car event. It was George Robert-

son at the wheel of a Simplex, that winning combination, who romped in to victory, covering the 318 miles in 5 hours 52 minutes, after the hardest sort of a fight, during which the seat of his car collapsed under this weight. The man to give him a stiff battle was Harry F. Grant, in an Alco, who had snatched the lead from big, husky George and lost out through a breaking chain in the last lap. Al. Poole, piloting an Isotta, scored second place, and E. H. Parker's Fiat was third. Robertson's triumph won for him the Lowell Trophy and a goodly sized package of coin of the realm. He declared that it was the hardest contest he had ever driven, owing to the rough sections on the back stretch of the course, which he was forced to negotiate at high speed in order to show.

On Labor Day, two days previously, the light car sweepstakes was run over the same course for the Vesper Club, Yorick Club and Merrimack Valley trophies. These three were won, respectively, by Robert Burman, Buick; Louis Chevrolet, Buick, and William Knipper, Chalmers-Detroit. On the intervening day, September 7. straightaway speed trials were held, Oldfield, in the Benz, proving the fastest in these, he having a far more powerful car than any of his competitors. These speed trials were not very exciting, but the meet as a whole, with the two long races, proved one of the best racing carnivals ever held on any road course.

#### RECORD BREAKING AT ST. PAUL.

Only a few days later, Ralph De Palma, in the "Cyclone," did a great streak of record breaking at two meets, held at Grand Rapids, Wis, and St. Paul, Minn. Ralph, previous to this time, held a number of marks for mile tracks between 1 and 26 miles, but on September 11 and 18 he shattered all of these materially, setting up a new mark of 50 4-5 seconds for the mile, which broke his own figure of :51 flat, made by him on the St. Paul course with the same car last year. Other amazing times he made were 10 miles in 8:49 3-5 and 25 miles in 22:59 3-5.

The same racing pilot drove to victory in the big car class in the Long Island Stock Car Derby, on September 29, carrying his 45 horse power Fiat over the 227 miles in 218 minutes. The contest was over a beautiful, smooth road course at Riverhead, promoted by "Senator" Morgan. A feature of this race was the speed made by Louis Chevrolet in a winning Buick in one of the light car classes, which was at an average of 69.6 miles an hour-a new American road record. Other respective classes in the lighter division were won by Frank Lescault, Palmer-Singer; W. H. Sharp, Sharp-Arrow, and Arthur See, Maxwell.

### NEW TWENTY-FOUR HOUR RECORD.

It was thought by many at the time Robinson made the world's 24 hour record for mile tracks, of 1,177 miles with the

Simplex last year, that this figure would stand for some time to come, but on October 21 last, at Brighton Beach, a Lozier car with Ralph Mulford and Cyrus Patschke driving, eclipsed the distance, rolling up 1,196 miles. Next season will see Robertson trying to break this mark and snatch the laurels once more.

#### FAST PORTOLA RACE.

The effete East does not hear a great deal about road and track contests in the Far West, but there was one on October 23 in California that deserves mention. Over the Portola circuit, in a sweepstakes race for 258 miles and under, Jack Fleming, in a Pope-Hartford, won the principal event, the free-for-all, skirting the above distance at a rate of 64 miles an hour, while in the same car he won his class over the required distance of 148 miles at the rate of 65.7 miles an hour, which is better time than was ever averaged in a Vanderbilt Cup race.

#### VANDERBILT CUP RACE.

As everyone knows, Harry F. Grant, in a six cylinder Alco, won the fifth Vanderbilt Cup race on October 30. Owing principally to the fact that so many of the starters met with mechanical trouble and accident, and the badly muddled scoring, the contest was not a great one. Throughout the race it was impossible at times to ascertain who was leading in the light car sweepstakes, while in the big car division an error in scoring nearly gave the victory to Parker in the Fiat. Parker, the only other contestant to finish, who was declared second, really thought he had won as he crossed the tape, and so did many of the spectators. Grant's average was 62.8 miles an hour, which was good time in view of the fact that the course was not a fast one. As for the small cars performance, most creditable showings were made by Ray Harroun in a Marmon, who won the Wheatley Hills Cup, and Joe Matson, in a Chalmers "30," who romped in first in his class, capturing the Massapequa trophy.

### ATLANTA SPEEDWAY OPENING.

When the Atlanta, Ga. motordrome was opened November 9-13, with a five days' racing carnival, it was an immense success. Thanks to the excellent management of the affair and the splendid condition of the two mile track there were no accidents, barring the burning of the old Pope-Toledo Vanderbilt Cup car. In fact the only criticism of the Atlanta course was that it was not banked as high at the turns as is Brooklands, England, and therefore the big cars could not take them at maximum speed and equal the time made abroad.

The feature of this opening meet was the shattering of all of the Indianapolis marks up to 200 miles, which was the longest distance run at Atlanta. The most spectacular and brilliant individual performance was that of Lewis Strang, in the 175 horse power Brooklands Fiat, formerly driven by Nazzaro, and holder of the world's record average speed. Strang

covered a mile in 37.7 seconds, outstripping Oldfield, Christie and others by a big margin. In fact Oldfield was so chagrined and disappointed at being beaten a couple of times by Strang, that he and Manager Bill Pickens packed up and departed for the cattle country of Texas.

Strang won five events with the big car at Atlanta, sweeping the boards clean for everything from one to ten mile distances. Robertson, in a stock Fiat, also won five events, notably 50 miles in 40:14, a new American mark. Various classes were won by Louis Disbrow, Rainier (notably the 200 mile event in 2:53:48); Chevrolet, who covered this distance in 2:46:48; while Harroun in a Marmon; Matson and Knipper, in Chalmers-Detroits, Aitkin in a National, and Nelson in a Buick, made excellent times and records in their classes. Atlanta furnished a fitting wind-up for an active racing year, which while disappointing in some respects was highly satisfactory in others.

Two new world's records were made at record trials held at the Indianapolis Speedway on December 17. Jack Aitkin in a National established a 20 mile stock car record of 16:18.41, and Lewis Strang in the 175 horse power Fiat a 5 mile record of 3:17.70.

#### TOURING CONTESTS.

As for touring and reliability contests this season manufacturers did not learn from them much that was new. Conducted along the lines of previous seasons, with nothing radically new, with the exception of more rigid technical examinations than before, there were numerous three days and one week runs of purely local interest in various parts of the country, the results of which are not of enough importance to mention. Among these were a three days' run in Pittsburg, Pa., early in April; the Quaker City Motor Club's endurance run and the Detroit Automobile Club's similar contest in the spring; also a few on the Pacific Coast. Three big tours, however. held this summer and fall, were noteworthy-the A. A. A. annual contest for the Glidden and Hower trophies, the Munsey tour and the New York-Atlanta tour.

The Glidden tour, July 12-30, starting from Detroit, Mich., and running westward as far as Denver and returning to Kansas City, Mo., where it wound up, was not as popular nor as well supported by the manufacturers as in the past. The route across the prairies led the contestants over some execrable roads, and it was anything but a comfortable excursion. The winner of the Glidden trophy was the Pierce-Arrow entry. driven by W. F. Winchester, who was the only contestant in the class credited with a perfect technical score, as well as perfect road score. Several contestants who pulled through the strenuous trip with perfect road tallies did not show clean technical slates, for when some of the technical committee started the work of examination, in which they banged spring leaves, nuts, etc, with wrenches, contestants found that this process loosened parts and caused penalizations. Another Pierce-Arrow car, driven by J. S. Williams, won the Hower trophy for the runabout class, while the Detroit trophy was won by a Chalmers-Detroit, piloted by Jean Bemb. No one save the winners seemed at all pleased with the tour. This, by the way, will go down in history as the last of the contests for the Glidden trophy, for it will be run no more.

A really good tour was the Munsey reliability contest from Washington, D. C., to Boston, Mass., and return, via Philadelphia, New York and Albany, September 21-29. Three dozen contestants started in this, the majority finishing with few penalizations. Only one perfect score, however, resulted. This was the Elmore contestant, driven by Frank Hardart, who was awarded the trophy. While promoted primarily as a publicity proposition for the Munsey newspapers in several of the cities visited, it served to awaken considerable interest at the capital and among dealers in the vicinity of the District of Columbia.

In much the same manner the New York-Atlanta tour, promoted by the New York Herald and the Atlanta Journal, October 25-November 5, awakened much interest in the South. Thanks to the efforts of the promoters a really good route from the metropolis to Georgia was laid out on what is known as the "National Highway." cars ran on a definite schedule, with a system of penalization for breaks and repairs, it was not so much an endurance run as a scheme to stimulate interest in road building and automobiles. Of the original thirty-five contestants, twenty-six-a large proportion-reached Atlanta with perfect scores. From this number it would have been hard to pick a single winner, for all of the cars were in good shape upon their arrival.

That other form of motoring competition-hill climbing—saw a few meets, the chief ones being at Wilkes-Barre, Pa., and Bridgeport, Conn., on May 31, and the Algonquin climb near Chicago in the summer. The unsatisfactory feature of hill climbing contests is that they are all necessarily local affairs, and no such thing as an American record or world's record is possible. Wilkes-Barre slope, "Giant's Despair," is perhaps the best example of a hill test for cars in the East. At the spring meet David Bruce-Brown covered the mile incline in 1:31 3-5, breaking the old record made by Willie Haupt in the Chadwick in 1908.

Taking it all in all, 1909 has been an active year in contests, and the prospects are that 1910 will be even more so.

### New Fifteen Mile Record.

Barney Oldfield, driving a 120 horse power Benz car, broke the world's speed record for 15 miles on a circular track at Ascot Park, Los Angeles, Cal., on December 26, lowering the time for the distance from 13:57 to 13:42 1-5. The former record was held by Ralph De Palma (Fiat).

### Crank Shaft Calculations and Construction.

### By Thor A. Waerner

We frequently hear the statements that mechanically the new automobile motors show little change in construction; that designers spend more time in standardizing and cheapening their construction than in efforts to add new features. As the majority of automobile manufacturers build motor cars to answer a certain price they are compelled to do so, but there will always be a market for those who fix the price to suit the best product.

Referring to crank shafts, we notice a departure from conventional design by the introduction of two bearing, four throw shafts. Several engineers have recently adopted this new type in cases where limited space and simplicity of construction are dominant factors. Some have even gone so far as to employ ball bearings for such crank shafts, but for the present, at least, most engineers have but little confidence in them.\* It seems safe, however, to state

readily be noticed by following the crank shaft calculations. Very much depends upon an even distribution of the deflections in the members of the crank shaft, so that shock may be least injurious to the bearings.

If it is not advisable to rely upon calculations for proportions of crank shafts, then we must face the same troubles that have been and are being experienced with numbers of crank shafts of conventional design. Why avoid careful calculations merely because practical examples are at hand to enable designers to build motors without having to bother with the slide rule? No data have been published for this new type of motor, consequently calculations are the only guide available. In making these calculations I have considered only the effects directly due to the thrust of the explosion, deeming it unnecessary to enter upon the problems arising from the effects of motion of the crank shaft. To make de-

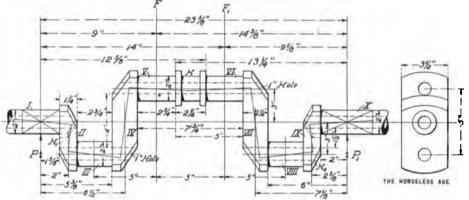


Fig. 1.

that for motors of very small bore and short stroke they may well be employed; they not only insure the ordinary advantages of ball bearings but reduce the size of the crank shaft considerably. This may

\*All of the two bearing, four throw crank shafts which have come under our observation are carried in ball bearings, and many engineers consider this essential on account of the localization of stress at the inner ends of the two bearings, if these are of the plain or parallel type, which, it is feared, would soon cause the crank shaft to break at these points.—ED.

ductions easier to the reader I shall consider a practical example. Fig. 1 represents a crank shaft for a four cylinder motor with a bore of 4 inches and a stroke of 5 inches, having plain bearings, with a longer one at the driving end. The initial pressure is taken as 250 pounds per square inch. The most important question is how much of a deflection of the crank shaft the main bearings will permit of. On the assumption that .003 inch is safe, the crank shaft proportions have been determined as follows:

Let 
$$D = \text{diameter of bearings.}$$
 $d = \text{diameter of hole in crank shaft.}$ 
 $h = \text{width of web.}$ 
 $b = \text{depth of web.}$ 
 $P = \text{reaction at left hand bearing.}$ 
 $P_1 = \text{reaction at right hand bearing.}$ 
 $F \text{ and } F_1 = \text{ultimate force at explosion in pounds per square inch.}$ 
 $E = \text{coefficient of elasticity} = 28,000,000.$ 

$$\frac{\pi}{64} \frac{(D^4 - d^4)}{64} = \text{moment of inertia, sections I, III, V, VI, VIII, X.}$$

$$\frac{b}{64} \frac{h^3}{12} = \text{moment of inertia, sections II, IV, VII, IX.}$$
For F and F<sub>1</sub> we have  $\frac{4^2\pi}{4} \times 250 = 3140.$ 
Considering F, we have for  $P = \frac{F \times 14\frac{5}{4}}{23\frac{5}{4}} = 1950$ ;  $P_1 = 1190.$ 

From the formula 
$$\frac{P \times W}{I \times E}$$
 we have for F :

Angularity at I, caused by deflection IV: 
$$\frac{P \times 6\frac{1}{8} \times 4}{\frac{b h^3}{12} \times E} = \frac{1950 \times 6\frac{1}{8} \times 4 \times 12}{3\frac{1}{8} \times 2\frac{1}{8} \times 28000000} = \frac{.00054''}{\frac{b h^3}{12} \times E}$$
Angularity at I, caused by deflection III: 
$$\frac{P(5\frac{1}{8} \times 2\frac{1}{8} - 2\frac{1}{8}^{3})}{\frac{\pi}{12} \times E} = \frac{1950 \times 5\frac{1}{8} \times 2\frac{1}{8} - 2\frac{1}{8}^{3})64}{\frac{1}{8} \times (2^4 - 1) \times 28000000} = \frac{.00061''}{\frac{b h^3}{12} \times E}$$
Angularity at I, caused by deflection II: 
$$\frac{P \times 2 \times 1\frac{1}{8}}{\frac{b h^3}{12} \times E} = \frac{1950 \times 2 \times 1\frac{1}{2} \times 12}{\frac{3\frac{1}{8} \times 1\frac{1}{8}^3 \times 28000000}{\frac{3\frac{1}{8} \times 1\frac{1}{8} \times 28000000}} = \frac{.00037''}{\frac{50000000}{12} \times \frac{3\frac{1}{8} \times 1\frac{1}{8} \times \frac{50}{8}}{\frac{50000000000}{12}} = \frac{.00013''}{12}$$
Total angularity at I, caused by deflections = I + II + III + IV =  $\frac{.00165''}{.00015''}$ 

Total angularity at I, caused by deflections = I + II + III + IV = 
$$\frac{.00165''}{0.0021''}$$

Angularity at X, caused by deflection VI:  $\frac{P_1(13\frac{1}{4} \times 5 - 5^2)}{\frac{\pi}{64} \times E} = \frac{.0021''}{64}$ 

Angularity at X, caused by deflection VII: 
$$\frac{P_1 \times .00054}{P} = \frac{.0003''}{P}$$
Angularity at X, caused by deflection VIII:  $\frac{P_1 \times .00061}{P} = \frac{.00037''}{P}$ 

Angularity at X, caused by deflection IX: 
$$\frac{P_1 \times .00037}{P} = .00019''$$

Angularity at X, caused by deflection X: 
$$\frac{P_1 \times 2}{\frac{\pi (D^4 - d^4)}{64} \times E} = \frac{.00011''}{}$$

Total angularity at X, caused by deflections  $VI + VIII + VIII + IX + X = \frac{.00307''}{}$ 

Considering 
$$F_1$$
, we have for  $P_1 = \frac{F_1 \times 14}{23\frac{1}{2}} = 1860$ ;  $P = 1280$ 

Angularity at X caused by deflection VII.  $\frac{P_1 \times 7\frac{1}{2} \times 4}{2} = 1860$ 

Angularity at X, caused by deflection VII: 
$$\frac{P_1 \times 7^{\frac{1}{2}} \times 4}{\frac{b h^3}{12} \times E} = \frac{.00057''}{12}$$

Angularity at X, caused by deflection VIII: 
$$\frac{P_1 \left(6 \times 2\frac{1}{4} - 2\frac{3}{4}\right)}{\frac{\pi \left(D^4 - d^4\right)}{64} \times E} = \frac{.0008''}{}$$

Angularity at X, caused by deflection IX: 
$$\frac{P_1 \times 2\frac{1}{5} \times 1\frac{1}{2}}{\frac{b h^3}{12} \times E} = .00046''$$

Angularity at X, caused by deflection X: 
$$\frac{P_1 \times 2}{\frac{\pi (D^4 - d^4)}{64} \times E} = \frac{.00018''}{.00018''}$$

Total angularity at X, caused by deflections = VII + VIII + IX + X = 
$$\frac{.002''}{}$$

Angularity at I, caused by deflection V: 
$$\frac{P(12\frac{5}{4} \times 5 - 5^2)}{\frac{\pi(D^4 - d^4)}{64} \times E} = \frac{.00175''}{.00175''}$$

Angularity at I, caused by deflection IV: 
$$\frac{P \times .00057}{P_1} = \underline{.00039''}$$

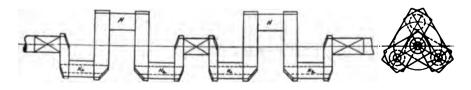
Angularity at I, caused by deflection III: 
$$\frac{P \times .0008}{P_1} = .00055''$$

Angularity at I, caused by deflection II: 
$$\frac{P \times .00046}{P_1} = .00031''$$

Angularity at I, caused by deflection I: 
$$\frac{P \times I_{k}^{B}}{\frac{\pi}{64}} = \frac{.00008''}{.00008''}$$

Total angularity at I caused by deflections: I + II + III + IV + V = .00318''

It will be noticed that supports have been considered in the centre of the bearings; less conservative designers may consider them close to Parts II and IX, thus eliminating Parts I and X from the calculation. The term angularity is used above to represent the displacement of point I.



By making section H proportionate with sections H1+H2 the crank shaft may be perfectly balanced. Shearing and twisting moments should not be ignored, but in a shaft of this type it is evident that they are of secondary importance. As the metal around the axis of rotation is of little value, the extreme fibre, remote from the axis, doing nearly all of the work, the shaft is lightened considerably by making it hollow.

Fig. 2 represents a crank shaft for six cylinder motors. One may conceive the neatness of construction of "sixes" having only three main bearings, three cylinders cast together, with inlet and exhaust manifolds integral with the casting. A shaft of this type will not be so cumbersome as the one in Fig. 1 may appear to be, and may also be perfectly well balanced by making H solid and drilling H1 and H2 to suit.

### Report of Ohio Automobile Department.

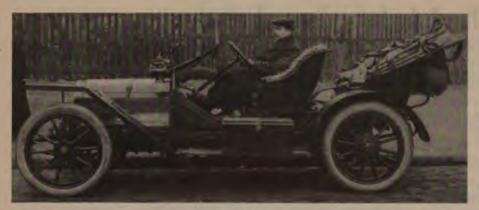
State Registrar of Automobiles Fred H. Caley has made public an interesting report covering the work of the Ohio State Automobile Department for the year 1909. The report shows that 23,000 motor cars of every description were registered for operation within the borders of the Buckeye State, which is considered a large number when the condition of Ohio roads is taken into consideration. Practically all motor cars in the State have been registered, and there are only a few cases where the owners evaded the law.

Cuyahoga County, which includes the city of Cleveland, is the banner county of the State, as far as the number of motor cars is concerned. In all 5,301 cars were registered from that county. Hamilton County, containing Cincinnati, is second with 1,539 cars, while Franklin County, which includes Columbus, is third with 1,357 cars. Lucas County, including Toledo, is fourth with 1,088 cars, and Montgomery County is fifth with 1,047 registrations.

In all 70 cars were registered with the State Department from owners living outside of the State for operation in Ohio. Indiana had 3 such owners and Kentucky 28; Arizona had I; Canada, 3; Florida, I; Delaware, 1; Colorado, 1; Maryland, 3; Michigan, 3; New Jersey, 4; New York, 8; Missouri, 1; Pennsylvania, 4; Rhode Island, 2; Texas 1, and West Virginia, 6.

The question of roads has considerable to do with the number of motor cars operated within certain areas. In Hamilton County, which contains fully a half million people, only 1,539 cars were registered, while the number registered from Cuyahoga County is almost four times that number. The reason is the hilly and stony roads around Cincinnati.

State Registrar Fred H. Caley has sent out a circular letter to all auto owners in the State, calling attention to the fact that they must secure 1910 tags by the first of the new year.



GREGOIRE CAR.

were thus required to cover almost 2,000 miles within a fortnight, which included roads of all kinds and grades of considerable steepness.

The contest was favored by pleasant weather throughout. On the first day the roads were rather greasy, owing to the fact that a week of rain had preceded the start of the contest. Nevertheless, all of the twenty-nine competing vehicles completed the run within the prescribed time limit of 7 hours 26 minutes, but three—the Barre-Niort, No. 13, driven by Ravaud, and the Doriot-Flandrins, Nos. 16 and 18, driven by Rivat and Godefroy, respectively—were penalized on account of mechanical troubles. The cause of penalization of the Barrie-Niort is said to have been nothing more serious than the breaking of the fan belt.

Up to Friday, December 10, eight of the twenty-nine contesting cars had received penalizations, and therefore lost their chance of being "classed." Considerable bad feeling was aroused among the contestants as the result of the very severe interpretation of the contest rules. Thus, for instance, the friction driven Turicum car, a Swiss product, was penalized because its driver had tightened a bolt securing the leather to the friction disc. The entrant protested against this penalization, and the contest committee eventually rescinded it.

The penalization of the Doriot-Flandrin No. 16, on account of the tightening of the inlet valve bolts, was temporarily suspended, pending further consideration by the committee. On Tuesday the Doriot-Flandrin No. 17, driven by Deschamps, arrived late at the end control, and decided to withdraw. The run on Wednesday, over the route Paris-Beauvais and back, brought the downfall of three further vehicles. The Turicum No. 23 was penalized for repairs to the brake lever; Barre-Niort No. 13 had a collision with No. 14 of the same make and suffered damage to its radiator, and Zenith No. 28 did not complete the run for some unknown reason.

On Tuesday, December 14, after ten of the fifteen stages had been completed, there were still seventeen competing vehicles with perfect scores, and it was then hoped that if the weather continued as good as it had been so far practically all of these would finish and be classed. The list of perfect score cars at this stage of the trial was as follows;

Sizaire-Naudin, Nos. 2 and 3; Gregoire, Nos. 5 and 6; Delage, No. 7; Hartu, No. 10; Barre-Niort, No. 15; Doriot-Flandrin, No. 16; Corre-La Licorne, Nos. 19 and 21; Turicum, No. 22; Alcyon, Nos. 25, 26 and 27; Demeester, No. 29, and Rolland-

Pilain, Nos. 30 and 31. There had withdrawn from the contest the following: Sizaire-Naudin, No. 1; Fouillaron, No. 12; Barre-Niort, No. 14; Doriot-Flandrin, No. 17; Corre-La Licorne, No. 20; Zenith, No. 28, and Rolland-Pilain, No. 32. The following cars continued with penalizations: Doriot-Flandrin, No. 18; Gregoire, No. 4; Barre-Niort, No. 13; Hurtu, No. 11, and Turicum, No. 23.

### Particulars of the Daimler-Megevet Cellular Radiator Patent Infringement Suit.

We have already given the verdict reached in the above case by the Swiss Federal Court, by which damages in excess of 300-000 francs were awarded the complainants. the Daimler Motor Company, An authorized representative of the Daimler Company. named Maemecke, applied for a patent in Switzerland on the so called cellular radiator-a proceeding often followed by well known manufacturers in order that the patent may attract less attention. This invention was imitated by the defendant Megevet on a large scale in 1902 by manufacturing, both in Geneva, Switzerland, and in Bellegarde, France, radiators on this system, and selling them everywhere. It was determined that from July, 1906, he sold from both factories 300 coolers per month, and in July. 1907, there were delivered from Geneva no less than 7,219, and from Bellegarde 2,630. As early as 1904 the complainant company. to whom the Maemecke patent had meanwhile been transferred, notified the Genera firm of its infringement of the patent, and ordered it to desist, but without success. Then they brought suit in the Geneva courts, asking for the award of damages and the destruction of the infringing tools. First these courts bluntly rejected the suit because the person named in the patent application, Maemecke, was neither the inventor nor his legal successor; it was, on the contrary, admitted that the complainants were the inventors. However, the patent application was not in their name, nor did



DORIOT-FLANDRIN TEN HORSE POWER MOTOR



FOUR CYLINDER, TWELVE-SIXTEEN HORSE POWER CORRE-LA LICONAL

they transfer the rights to the invention to Maemecke.

This decision was, however, revoked by the Swiss Federal Court, which returned the case to the Geneva courts for the decision of the other questions involved. The patent, they held, could not be overthrown because the formerly registered owner was not the inventor. Besides, Maemecke had his name inserted at the request of the inventor. For this reason the patent could not be considered as brought into his possession by illegitimate means.

Thereupon, the Geneva courts took the patent up for the second time, and this time they gave a verdict for 70,000 francs that defendant made the radiators slightly different from complainants', and also obtained a Swiss patent for this method of construction. According to the testimony of experts, the arrangement of the cooler tubes is the same, and the deviations are altogether of a secondary nature. The objection of defendant that the patent of complainants had become invalid because it was not manufactured, complainants manufacturing according to the German patent, which differed in one essential point from the Swiss patent (which was not admitted by the experts), was also declared void. Besides the defendant in the course of the proceedings had himself alluded to the



FRENCH LIGHT CAR TRIALS-DORIOT-FLANDRIN CAR.

against the copyist. This decision was appealed from to the Federal Court by both parties, complainants demanding greater damages and defendant rejection of the verdict and a new expert investigation. The Federal Court, as is known, rendered a verdice for 300,000 francs damages and costs against defendant, and ordered publication of the verdict at the expense of defendant on the following grounds:

The objection of defendant that the invention was not new at the time of the application for patent in Switzerland is not substantiated. Even if it were true that shortly before the filing of the application a Mercedes automobile, with a cellular radiator, was driven in Switzerland, the novelty of the invention would still be unaffected, for the complainants had filed a patent application in Germany, and, according to a German-Swiss patent treaty, an inventor who has filed his application in Germany enjoys the advantage of priority rights in Switzerland if he files his application in the latter country inside of three months from the date of issue of his German patent, which was the case here.

The assertion of defendant that he had made arrangements before application for patent was made in Switzerland to manufacture a similar cooler also is of no weight, as these preparations fell in the time after the application for the German patent. The imitation is quite obvious, notwithstanding

identity of the German and Swiss patents. The last rejoinder was also void, namely that the radiators of the Daimler Company did not bear the Swiss patent mark (Helvetian Cross). German patents are immune from this requirement under certain conditions applying in this case, under the terms of the patent treaty.

The Geneva courts set down the indemnity to be paid at 5 francs per radiator, while defendant earned an average of 57.80 francs per radiator, on the ground that complainants do not manufacture radiators to sell them as such, but would have used them on their own automobiles. It was, however, not proven that complainants sold fewer automobiles in consequence of the imitation of defendant. The Federal Court, however, held the opinion that defendant would have to give up the entire profits derived from the imitation, even if complainants, by reason of a different method of exploitation, had not secured these same profits. However, defendant is not required to give up the entire profits derived from the manufacture of the apparatus, but only that portion of the profits which depends upon the invention.

In this connection it is to be kept in mind that defendant without the imitation would have built radiators according to some other system, and the profits he would have made at that should be left him. He, therefore,

has to pay such an amount as would have been named by experts as a fair royalty if complainants had been forced to give a license. This amount is set down at 20-25 francs by the Federal Court. This gives for the total of radiators manufactured up to July, 1909, approximately, 300,000 francs, inclusive of the 7,000 francs allowed by the lower court for costs. Complainants had asked for more than 7,000,000 francs damages, based not upon the average price of 266 francs obtained by defendant, but upon the very much higher prices secured by themselves. The court, however, was of the opinion that the enormous sales of defendant were the result of his low price, and that no higher price could be considered if the total number of radiators sold was taken for the basis of the amount of damages. Besides, only the radiators manufactured in Geneva were taken into account. It is true that the coolers manufactured in Bellegarde, France, were sold from Geneva, but they were never brought into Swiss territory, as they were shipped direct from the factory. Even though not only the manufacture but also the sale of patented objects is forbidden, the infringing effects of sales must be apparent within the country. If the article is not covered by patent in some foreign country to which it is shipped, it is impossible to forbid and impose a pena'ty on the sale effected within the country. This would lead to international conflicts. This conforms to German practice and views, while, on the other hand, French courts have rendered decisions to the contrary. A minority of the Federal judges was ready to apply the French ruling and raise the damages to be awarded to complainants to half a million francs-Automobil Welt.

The City Council of Hamburg, Germany, recently made an appropriation of 95,000 marks for the acquisition of a second electrically propelled fire train (motor fire engine, hose and ladder wagon, etc.).

The technical committee appointed in connection with the Swiss trials of speed indicators, which were organized by the Swiss Federal Government with the object of making the fitting of such indicators obligatory, has made its report to the Department of the Interior. The labors of the committee began on July 10.

An automobile faction has been formed in the French Chamber of Deputies, which about forty deputies of all shades of political opinion immediately joined. The new combine will fight the proposed increase in automobile taxes. The president of the new organization is Georges Berry, and the vice presidents are Marquis de Dion and Deputy Willm.

### DESCRIPTIONS OF NEW VEHICLES AND PARTS.

#### The 1010 Cartercar.

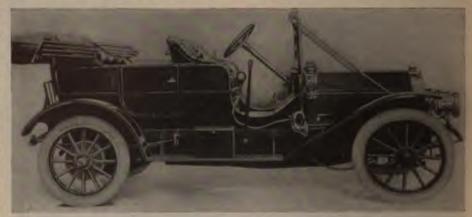
Considerable change will be noticed in the Cartercar models for 1910, manufactured by the Cartercar Company, of Pontiac, Mich., over those shown during the season of 1909. The most perceptible change is from a two cylinder motor in last season's product to a four cylinder chassis and one entirely new model of chassis. The cars are larger than have been produced in the past, having more power, and the prices are somewhat higher. The line consists of a Model L five passenger touring car and a Model H runabout with interchangeable bodies.

A new feature is a transmission driver. This arrangement does away with all adjustments, lubrication or possibility of wear. The friction disc is larger this year, while the friction fibre is made in three separate pieces, and does not require tearing down the transmission when it is to be replaced. The Model H has a plain deck at the rear on which can be placed a rumble box, a single rumble seat, a double surrey seat or a miniature tonneau, at the will of the owner. This car has a wheel base of 100 inches, while Model L has a wheel base of 110 inches. Model L chassis can also be equipped as a taxicab.

The water for cooling the Model L motor is circulated by means of a gear driven centrifugal pump located on the left hand side of the motor, while circulation in Model H motor is by the thermo-siphon system. The cylinders of both motors are cast from gray iron in pairs, with the valves all on one side and actuated by a single cam shaft. The water jackets in all are long and increase slightly at the top to permit a larger volume of water to surround the cylinder heads. In each instance the water outlet is from the centre at the top

and between the cylinders of each pair. The water in Model L motor is, however, carried from the pump on the left side of the motor through between the two pairs of cylinder castings in a brass water pipe, and enters the water jackets just below the valve seats, midway between the cylinders of each set.

Since only the motors of the two chasses differ materially, and the common bracket for tightening the driving belt. The pump shaft is driven through an idler gear from the crank shaft gear. The crank shaft is drop forged from open hearth sted, and has three main bearings, all of which are contained in the upper portion of the crank case. On the rear left hand motor hanger arm is a capped pipe, which serves the double purpose of crank case compression relief pipe and oil filler tube. The



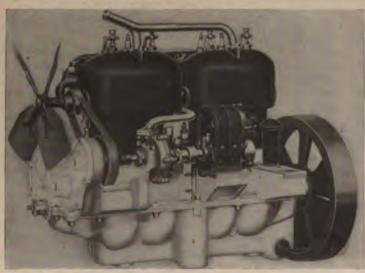
CARTERCAR MODEL "L," FIVE PASSENGER TOURING CAR.

points of both have been described in part above, the points wherein they differ will be taken up separately and both chasses otherwise described as one.

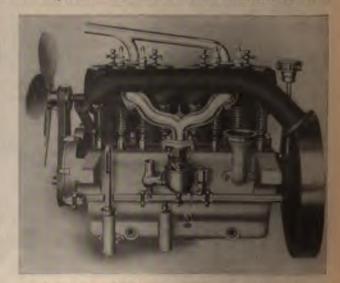
Model L motor has a 4¼ inch bore and 4½ inch stroke, producing 30 horse power. Cylinders and pistons are ground to size. Care is taken to insure the positive alignment of the crank shaft and cam shaft, and all moving parts are ground. The centrifugal pump and magneto are both gear driven by the same jointed shaft, which is also provided with a pulley for driving the air circulating fan by means of a flat belt. The fan stud is located in an adjustable

lower portion of the crank case has the splash basins cast spherical, so that the oil cannot run away from the dip of the connecting rods when climbing a grade.

The lubrication of Models L and H is by the combined pump and splash system. A quantity of oil is carried in a well or reservoir at the base of the crank case, and a bath of oil in the crank case itself, into which the connecting rods dip. The oil in the splash basins is constantly renewed by the pump from the supply in the oil well beneath, the surplus oil draining off through the overflow pipes, thus maintaining a fixed level of oil. The carburetors are of the



LEFT SIDE OF MODEL "L," THIRTY-THIRTY-FIVE HORSE POWER



LEFT SIDE OF MODEL "H," TWENTY-FIVE HOUSE POWER
MOTOR.

ral float feed type, and are self adjustafter once being set.

dual system of ignition is employed, isting of a low tension, direct driven neto and an auxiliary battery, carried netal box on the running board. The neto current, as well as the battery ent, is transformed by means of a tenon-vibrating coil carried on the

le Cartercar transmission consists of a all alloy disc on the end of a shaft ected with the flywheel. Against this bears a sliding friction wheel, with a rim, which can be moved to any point he surface from the centre to the circerence, thus giving any speed desired. neans of sprockets and a chain this tershaft is connected with the rear



TRANSMISSION THRUST BEARING.

Speed changes are made by means hand lever, this single lever giving ariations of speed from the lowest to highest, and also the reverse. After lever has been placed in the desired ion the friction disc and wheel are ght into contact by means of the left, this motion corresponding to the open of a clutch pedal in connection with ag gear transmissions. The moving of the transmission are lubricated by so of three screw grease cups.

e transmission shafts are mounted on



TRANSMISSION DRIVER.

high duty ball bearings. The thrust bearing of the disc shaft is carried in a hanger immediately in front of the disc, and is of the four point type. The bearings at both ends of the cross shaft are annular ball, with double cups and sleeves, and two rows of balls. These bearings are carried in adjustable hangers, which are bolted rigidly to the side channels of the frame. Both the disc shaft and cross shaft are turned and ground to size.

The transmission "driver," which transmits power from the engine, is of a new pattern, and greatly improved over that formerly employed. This driver consists of a cross member keyed rigidly to the forward end of the disc shaft, to which are secured two flat tempered steel plates, the opposite ends of which are bolted to the flywheel itself. The rotation of the flywheel exerts a straight pull on these plates, thus rotating the disc, and at the same time the disc and shaft are free to slide forward and back without restraint.

The pedals are of a new design, giving a much freer and easier action, together with a more comfortable position for the feet. The ratchets are positive and are operated by the slightest touch. Brakes of a new design are used, and the brake drums have been increased to a diameter of 14 inches. The reverse of the friction wheel acts as a powerful emergency brake.

The drive chain is encased in a cast metal oil tight casing, permitting the chain to run in a continual bath of oil, and protected from dirt and water. The rear axle is of the tubular, divided type, and strongly trussed. The differential is of spur gear type. The axle shafts are of special steel, and carried on Hyatt roller bearings. The front axle is tubular, of new drop pattern. The yokes and knuckles are of a new style and increased in size over last year, while ball bearings are used in the wheels.

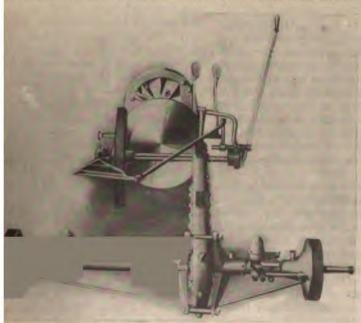
The frame is hot riveted and made from



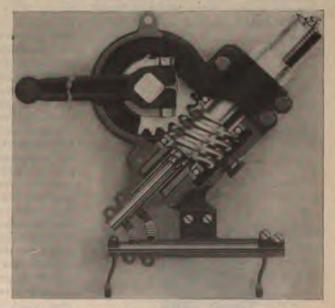
CROSS SHAFT BEARING.

cold pressed nickel steel of channel section. The steering gear is worm and sector. Adjustment is provided so that all backlash or lost motion can be taken up, there being ball thrust bearings above and below the worm.

The motor in Model H has a 4 inch bore and 4 inch stroke, and differs from that of Model L in that it has the thermo-siphon system of cooling instead of pump circulation. Semi-elliptic springs are used all around, those on Model L being 46 inches long in front and 52 inches long at the rear, and those on Model H 38 inches and 45 inches, respectively.



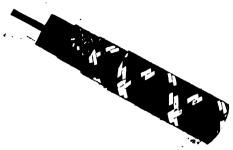
FRICTION TRANSMISSION AND CHAIN-IN-OIL DRIVE



STEERING GEAR, SHOWING WORM AND SECTOR, WITH PROVISION FOR ADJUSTMENT.

#### Diamond Ignition Cable.

In connection with their line of auto tires and accessories, the Diamond Rubber Company, of Akron, Ohio, are now marketing a complete line of ignition cables. Their Class A three-eighth inch secondary cable consists of thirty-seven strands of No. 30 B & S gauge copper wires, which are insulated



with a high grade rubber compound, which is covered with a black glazed braid. It is stated that this cable has been used successfully by several manufacturers for some years. H. J. Woodard is manager of the company's insulated wire and cable department, which manufactures the ignition cable.

#### The Clark Lock Nut.

The lock nut herewith illustrated is made by the Interlocking Nut and Bolt Company, of Pittsburg, and is claimed to be applicable to automobile work. The use of this lock nut requires that the necessary length of the bolt be definitely ascertained, so the end of the bolt will come flush with the outside of the nut when the latter is drawn up tight. The end of the bolt having been slotted to a proper depth, a specially designed chisel is inserted, and the threads of the bolt are forced into the threads of the nut. At the same instant an overreaching jaw of the chisel attacks the nut and forces a portion of the nut into the slot in the bolt, thus interlocking, first the bolt into the nut and then a portion of the nut into the bolt.



CLARK LOCK NUT AND CHISEL

It is claimed for this lock nut that it is absolutely positive, that it can be removed with an ordinary wrench with a slight extra pressure, and that it can be replaced and locked again as firmly as in the first instance.

### The Michelin Anti-Skid Tires.

The Michelin anti-skid tire was invented, patented and first marketed by Michelin in 1905. It was in that year, just before the last Gordon Bennett Cup race, that the late Leon Thery, one of the world's most famous drivers and winner of that great motoring classic, introduced Michelin anti-skid tires. As a matter of fact, the first four cars to finish on that notable occasion were equipped with Michelins.

The tread of the Michelin anti-skid and the wearing surfaces of the side walls are protected by a tough but flexible oxhide band, which is an integral part of the tire and not an attachment, and in this are imbedded from three to five rows of hardened steel rivets or studs. The Michelin Company do not indorse the various detachable anti-skid devices now on the market, which



MICHELIN ANTI-SKID TIRE.

are claimed to be injurious to the rubber envelope and to destroy its flexibility.

In the Michelin construction the full resiliency of the tire is claimed to be preserved, because the lower side wall, or that part immediately above the beads, is of rubber, which permits the tire to absorb all shocks and jars, the same as any other good pneumatic tire. At the same time the oxhide leather band protects the tread from cuts and punctures, which prolongs the life of the envelope.

Michelin anti-skids are made in both American and metric sizes, and are guaranteed by the manufacturers for use on clincher rims and on all well known quick detachable rims of standard dimensions designed for clincher type tires.

It is stated in a circular issued recently that the danger of skidding is greatest when traveling over Belgian block, brick or asphalt, which is particularly slippery after a light rain, and that anti-skid tires of the type described practically eliminate this dan-

gerous tendency. It is pointed out that Chevrolet used Michelin anti-skids when he averaged 70 miles an hour with his Buick car in the Riverhead-Mattituck race on Long Island in September.

### Staggering Tire Expense of London Taxicabs.

By Roy LINDSAY.

Some two years ago the writer, when giving an account of the then position of the taxicab business in England, referred to a prospectus issued by the General Motor Cab Company, Ltd., asking for greatly increased capital requirements from the public, wherein very rosy statements were made respecting the certainty of enormous net profits being earned. The section of the prospectus which was particularly criticised was that in relation to the cost of pneumatic tires. The public were told that a very satisfactory contract was running for the supply of new tires and the renovation of old ones, but they were not informed that this contract had but six months to run and that it had been made with a large French house who had also helped to finance the original flotation.

At the annual meeting of the General Motor Cab Company, Ltd., held a few days ago in London, the chairman announced that, with an average number of 1,180 cabs in service for the twelve months covered by the accounts, the cost of renewals and repairs only of pneumatic tires had reached the huge sum of \$520,000. In consequence. while the preferred shareholders would receive their 7 per cent., the ordinary shareholders would get nothing. Further, as it was hoped to have 1,800 cabs in service daily during 1910, tire renewals would possibly figure at \$1,000,000 in the next year's account! This was cold comfort for the shareholders, who were calmly notified that the directors, after mature consideration. were convinced that permanent success could only be looked for in the evolution of taxicabs built specially to travel upon solid tires. The gentleman who made this remark also said that the initial cost of all the cabs was being written off at the rate of 161/2 per cent. per annum.

A committee has been organized in Paris, on the initiative of Marquis De Dion, which occupies itself with the organization of a great race for the season of 1910, to take the place of the Grand Prix abandoned by the A. C. of France. Much criticism is being heaped upon the club, and one publication demands the closing by the police of the "gambling den of the Place de la Concorde."

It is rumored that the tax free importation of petroleum and gasoline into Austria may soon come to an end, and the Austrian A. C. has addressed a petition to the Minister of Finance protesting against this proposed move in the name of all of the Austrian automobile clubs and associations.

### COMMENTS AND QUERIES OF READERS.

### Mathematical Articles-The Other Side.

Editor Horseless Age:

In the December 15 issue of your valuable paper you gave some space to a few readers who seem to be in favor of your publishing mathematical articles, and I would ask you to note what a man has to say who does not care much to read them all the while. I believe these gentlemen will understand that their protest was altogether too one sided.

I have been a subscriber to your journal from 1899 to the present, and it was not at all to my liking to have served out to me so many purely mathematical articles. Of course, I know your valuable paper is mostly intended for the trade, and such amateurs as are trying to work in a small way or experimenting, but you surely have a good many subscribers who like myself want to hear something about the upkeep of autos and the progress in construction of machines. Even if you give descriptions of new models of different makes, you don't often report really new points. For instance, there seems to be a giving up of mechanical oilers, which are replaced by an engine driven crank case pump. You never mentioned this at length, except in one or two articles about new models, and then in the briefest possible way. Now that's just one point out of many.

What I object to is illustrated by the following. I do not remember ever having seen anything about the following questions, important to an auto owner: How to care for auto tops, to keep them in good shape and keep the canvas or leather from crack-You wrote about tires, how much load they ought to carry, but never or seldom discuss how to repair them nor give hints that will come handy to those who have small vulcanizers (the article in the December 15 issue is by far too vague to be of much value). How can an owner keep a magneto in good shape? How should he care for spark plugs, and find if they are short circuiting; this latter surely is a puzzling trouble to a good many owners. How about misfiring? What's the best way to keep down the noise of slightly worn gears? How to make over wheels with clincher tire outfit so they will take quick detachable rims and yet use the old clincher shoes?

I have had a steamer (bought in 1899), an air cooler, a one cylinder water cooler and a four cylinder water cooler, and always tried to keep them in repair myself. I also did it after a fashion, even in those days when you could not stop in the street anywhere without drawing a crowd and being asked continually "Did you break down?" My autos were always smoothly running along.

Now in conclusion I want to say I don't write you this letter to advise you how to run your paper, but only to show you what one class of people want and are looking for. Surely nobody would expect you to print mathematical articles to the exclusion of everything else, or give all your space to steamers or electrics (which you are not doing), while steamers and electrics are made and sold yet.

PH. F. STEPHANI.

### Varying the Peak of the Current Wave to Correspond With the Time of the Spark.

Editor Horseless Age:

Referring to the letter of Henry Hess on "Magneto Ignition of Motors at Slow Speeds," I notice that he mentions only the magneto which he represents in the United States as giving a full spark at any point of the position of the armature. There are quite a number of machines on the market of the indirectly driven type; that is, those with armatures not rigidly fixed to the driving contrivance, which are similar in principle to the Taunus make of Frankfort handled by Mr. Hess.

As Mr. Hess does not state the make of machines he tested, nor mention the year, type, etc., his disclosures of tests, by giving simply the number of machines, are of little value, and simply serve to draw attention to his particular pattern. If Mr. Hess will test a latest pattern Bosch, Unterberg, Simms, Fein, Eisemann, Nieuport, Nilmelior, etc., he will find that the spark generated is quite good for all reasonable speeds, and this can be ascertained without the trouble of fancy tests.

If any experiments of a thorough character had been made it would have been wise to measure the end thrust of the armature of any other machine shifting the armature during its working, and thus give data which would be of value to all, inventors and manufacturers alike.

A short description of magnetos with armatures giving a spark of maximum volume, no matter how the ignition is timed, may be of some interest.

The Eisemann Company were the first to adopt this principle, after an Englishman had dropped the invention. The Eisemann magneto had a screw on the spindle and a sleeve with an outside attachment; in this way the armature while running could be brought to the "peak" position at any time. The company also made a machine with magnets movable around the armature.

Breguet had a sleeve between the pole pieces and the armature.

Pianoli moved his armature similarly to Eisemann.

Bosch had a similar device.

Bullock moves his magnets around the armature,

Remy, New Witherbee, another Indianapolis company, and Starker, a German firm, advance the armature instead of the contact breaker.

Muirhead, Thompson and Taunus use a differential device.

Splitdorf has lately applied for a patent on a device similar to the Eisemann arrangement, and promises great things.

FRED I. HOFFMAN.

### Front Wheel Brakes.

Editor Horseless Age:

Will you permit me to supplement what your London correspondent says regarding "front wheel brakes" at the London Show?

The exhibition of front wheel brakes on standard and well known cars was one of the great features of the show, and drew the most intelligent and, aside from a few vaudeville features, the largest crowds of the show. The passing of transmission brakes was also rather a marked feature of the show. Few, except cheap cars and off makes, had transmission brakes. Double brakes on each rear wheel were the rule among the best cars.

Front wheel brakes, by the way, are more efficient than rear wheel brakes, because in going down hill or in sudden stops the weight of the car piles up on the front wheels and gives their tires, therefore, more friction than is possible with rear wheels under these circumstances. For precisely these reasons rear wheels are more efficient for driving when starting or when climbing steep hills. Rear wheel drives and front wheel brakes give the ideal condition for starting and stopping.

Front wheel brakes not only almost absolutely prevent skidding but will correct skidding when begun by the action of rear wheel brakes.

I have no interest in the matter beyond that of the ordinary car user. H

### Typographical Error Corrected.

Editor Horseless Age:

In the reproduction of my short note about cold weather starting, which you were kind enough to print, you omitted the minus sign before the 30, which was highly essential to the context, and very much weakened the force of the article.

H. M. WHEELER.

[We noticed the omission of the minus sign only after the paper was out.—En.]

### Injunction Against E-M-F Company Denied

Two suits were brought by the Studebaker interests last week to restrain the E-M-F Company from repudiating the exclusive distributing agency contract between the two firms. The Studebakers first applied for an injunction from Judge Swan restraining the E-M-F Company from selling its output to any company other than the Studebaker Automobile Company. The hearing of the bill is to come up in Detroit on Monday, January 3. At the same time Frederick S. Fish, Clement Studebaker, Jr., and Hayden Eames, the Studebaker stockholders, who bought out the interests of W. E. Metzger, B. F. Everitt and William Kelly in the E-M-F Company, as minority stockholders in the Detroit concern, appealed to Judge Henry F. Severens at Cincinnati to have the repudiation of the Studebaker contract by the E-M-F Company declared null and void because they, as directors of the local company, were not consulted in the act.

The documents filed in evidence in the above two cases throw some interesting side lights on the events which led up to the rupture. From the exhibits attached to one bill it appears that Messrs. Everitt and Metzger were led to dispose of their stock in the E-M-F Company by disagreements with Walter Flanders, as to the selling policy to be pursued. Mr. Flanders in a letter to the stockholders urged them to take advantage of the selling organization of the Studebaker Company for the marketing of E-M-F products, and cited a profit of \$30,-000 from the old Wayne Company and a profit of \$50,000 from the purchase of the Northern Motor Car Company, both of which were made profitable through his offices, as reasons why the E-M-F directors should take his advice in the matter of the selling policy.

Subsequently a contract with the Stude-bakers became operative August 5, 1908. following the acquisition of 36,741 shares of E-M-F stock by Fish, Studebaker and Eames. This contract was continued in April, 1909, and was renewed from September I, 1909. The contract provides that the Studebakers were to market the entire output of the E-M-F Company, taking the cars at an average rate of 1,000 a month at the rate of \$900 per car for E-M-F "Thirties," which rate, according to one of the exhibits, allowed the E-M-F Company a profit of \$150 a car.

The answer of the E-M-F Company, after citing the various reasons which prompted the company to annul the selling contract with the Studebakers, that have already been published, goes on to show that the Studebaker Company is not a manufacturing company but a sales concern, with a capital of \$100,000, while the E-M-F Company has an investment of \$2.582,681 in its six plants, and that it has contracts for material with sixty firms, aggregating \$5,000,000. It is disclosed by the answer that

the contracts made by the company for parts and materials are based upon the cost plus a fixed percentage of profit, so that all these firms would be affected if the factory should be closed.

Judge Severens, of the United States Circuit Court at Kalamazoo, Mich., granted the restraining order asked for, but on December 24, after hearing the testimony of both sides on the two previous days, he denied the motion for an injunction. The judge's decision reads as follows:

"Upon this motion for a preliminary injunction it is to be observed:

"First-That the complainants are stockholders and that they do not sue in their own right, but found their proceeding upon an apprehended injury to the corporation in which they are stockholders. They are permitted by the rules and practice of equity to do this in a case where the board of directors, which is the normal agency of the corporation for the prosecution of suits for remedies to secure a right of or prevent an injury to the corporation, is directly charged with responsibility for the wrong or injury done or threatened to the corporation. This is a necessary expedient because of the attitule of the board of directors. Otherwise, the corporation would be unable to relieve itself. In such cases the stockholders are the agency by which the corporation gains access to the court, and its interests are supposed to be in friendly hands.

"This suit, then, is practically one involving a controversy between the Everitt Metzger-Flanders Company and its board of directors—or rather, having reference to the particular facts, the majority of the board of directors—who are charged with misconduct.

"Upon this alignment of parties a suggestion of difficulty is presented as to whether the requisite diversity of citizenship to found the jurisdiction of the court is shown. But, although I am by no means certain, I am inclined to think that the court would look to the citizenship of the company stockholders on the one hand and that of the members of the majority of the board, who are charged with fault, on the other, and if so, jurisdiction exists.

"The gravamen of the case consists in the charge that the defendant directors have resolved to, or are about to, put an end to a certain contract made by the Everitt-Metzger-Flanders Company with the Stude-baker Automobile Company on or about August 5, 1908, for the constituting of the latter as a selling agent of the former on a stipulated commission for the disposition of automobiles manufactured by the former company; which contract was subsequently extended so as to include all the automobiles which that company would manufacture.

"For the present it is not necessary to go into the details of this contract. The Stude-

baker Company is not a party to this suitfor reasons which the majority of the board of directors of the Everitt-Metzger-Flanders Company regard as sufficient to require it in the interests of their company, principal of such reasons being that the Studebaker Automobile Company was not prosecuting the business of making sales with due diligence, and was selling other machines conjointly with such sales in a manner which hampers the disposition of the machines manufactured by the Everitt-Metzger-Flanders Company, and they say that they are advised that on account of the non-feasances of the Studebaker Automobile Company of the obligations on its part to be performed the Everitt-Metzger-Flanders Company has the right which it proposes to exercise to call the contract off and refuse to longer treat it as operative.

"It is difficult to see how this court could make a decree such as is prayed for which would not seriously affect the rights of the Studebaker Automobile Company. And in order to make any such decree the Studebaker Company is a necessary party to the suit, and I have very grave doubt whether this court ought, or could, properly render a decree of so much importance to the company without its presence.

"If the final decree in this case should be for the defendant, it must necessarily rest upon the ground that the defendants were justified by the conduct of the Studebaker Company, and that the defendants might lawfully take that position as the basis of their future attitude toward the Studebaker Company, and if that right be conceded the latter company would be cut out of the right to assert its claim, except that it might be able to do so by bringing another suit from which the judgment in this suit would not preclude them. But the rule which requires the presence of all necessary parties rests upon the public policy of settling a single controversy by bringing all parties interested therein before the court.

"The proper mode of determining such a question would, as I think, be in a suit between the two corporations. Such a suit I am advised is now pending in this court brought by the Studebaker Company, for relief against the proposed action of these defending directors. In such a suit the legality of the proposed action of the defendant company can be definitely presented with the proper parties before the court and a conclusive determination of the rights of the parties be made.

"But I do not propose to determine this motion upon the grounds that a necessary party is not here present. For, in my opinion, whether or not the proposed action by the board of directors is justified by the stipulations of their contract and the alleged violations of them by the Studebaker Company, is a question of business addressed to the judgment of the board of directors, and is not one in which the court unless in very special instances—such as when the board, disregarding its duty to

exercise its honest judgment in the affairs of the company, turns aside to a scheme which is fraudulent and injurious to it. In such a case I have no doubt that it would be competent and necessary for a court of equity to interfere and prevent such unlawful action by the board of directors; but in such a case the test must be, not whether the board is committing an error of judgment, but whether it has wilfully deserted its proper functions and perverted its powers by the promotion of schemes mischievous to the corporation.

"In the present case no such condition is shown. Whatever the court might think might be wise and expedient in dealing with the question whether the company should declare the contract no longer of binding force on account of what the other company has done or neglected to do, I should not be justified by any facts appearing so far in this case in finding that there was anything more than error or bad judgment in the course which the board are pursuing. There is at all times a presumption of good faith, and this presumption is enforced by the presumption that a man would not willfully pursue a course harmful to himself; and these directors own a large part of the stock of their corporation. I do not think it can fairly be said that the presumptions are overcome, and must therefore hold that the allegation of fraudulent misconduct on the part of the board of directors is not sustained; that therefore no sufficient ground for the interposition of a court of equity is shown, and that the motion for an injunction pendente lite should be overruled.

"An order conforming to this conclusion may be entered.

"(Signed) H. F. Severens,
"Circuit Judge."

When the case of the Studebaker Automobile Company against the E-M-F Company came up before Judge Swan in the United States District Court in Detroit on December 27, counsel for the Studebaker Company asked for leave to withdraw the application for an injunction against the E-M-F Company. Counsel for the latter company asked for time to consider the matter, and both sides returned to the court room at 2 o'clock p. m., when Judge W. L. Carpenter, for the E-M-F Company, opposed the application, unless the court also estopped the plaintiff from beginning a similar proceeding elsewhere. It was evidently the opinion of counsel for the E-M-F Company that the object of the Studebaker interests was to change the scene of the action. Judge Swan took the matter under advisement until Wednesday morning.

### Another Suit Under Lehman Spark Plug Patent.

J. H. Lehman, of New York, on November 26, 1909, filed an application for an injunction in the United States Circuit Court, Southern District of New York, against C. F. Splitdorf, of this city, for alleged in-

### New Licensed Association Members.

As we go to press we learn that eight automobile manufacturing firms have been admitted to membership in the Association of Licensed Automobile Manufacturers. They are as follows:

Bartholomew Company, Peoria, Ill.
Brush Runabout Company, Detroit,

Mich.

Buckeye Manufacturing Company, Anderson, Ind.

Moline Automobile Company, Moline,

Moon Motor Car Company, St. Louis, Mo.

Regal Motor Car Company, Detroit, Mich.

National Motor Vehicle Company, Indianapolis, Ind.

Nordyke & Marmon Company, Indianapolis, Ind.

fringement of Patent No. 741,684, filed February 6, 1902, and granted October 20, 1903. This suit is similar to the one brought against the A. R. Mosler Company, an application for an injunction against whom was filed September 13, 1909, and the answer to which was filed December 6, 1909.

### Legal Notes.

A contractor and builder of Trenton, N. J., has been fined \$10 for allowing his fourteen year old son to operate a six cylinder car after he had been warned repeatedly by the authorities. The maximum penalty for the offense is a \$500 fine and sixty days in jail.

Secretary of State Rogers, of Connecticut, has decided that the accident in New Britain on November 5, in which Henry Sherman, of that city, received injuries which resulted in his death, was not the fault of the operator, Richard M. Hill, of New Britain, and Hill's license will not be revoked.

Mayor Miller, of Seattle, Wash., has called the attention of the City Council to the fact that the recently adopted city ordinance providing that all automobiles owned by the city should be provided with easily legible signs to that effect, and carrying an appropriation of \$250 for the purchase of the signs, is not being enforced.

Secretary of State Rogers, of Connecticut, has sent out notice that all automobile license tags must be renewed on January 1. The private owners' tags will have white figures on a red background; manufacturers' and dealers' tags, red figures on a white background, and drivers' markers, yellow figures on a black background. All owners turning in their old tags get the new ones without cost.

### Trade Personals.

Fred M. Hoblitt, a pioneer automobile traveling salesman, has been appointed supervisor of Alco agencies by the American Locomotive Company. Mr. Hoblitt, on his last Western trip for the company, estab-

lished new agencies in San Francisco, Seattle, Denver and Minneapolis.

Webb Jay has relinquished his interest in the Premier Motor Car Company of Illinois, and will become a traveling representative of the Premier Motor Manufacturing Company of Indianapolis.

W. E. Stalnaker has assumed the presidency of the Premier Motor Car Company of Illinois, 2329 Michigan avenue, Chicago, handling the Premier and the Badger cars.

H. T. Boulden, representing the sales department of Reliance Motor Truck Company, of Owosso, Mich., is making a Southern trip for the purpose of establishing selling agencies for the Reliance line in Cincinnati, Louisville, Atlanta and Jacksonville, Fla.

W. H. Kirkpatrick, sales manager of the Peerless Motor Car Company, of Cleveland, will sever his connection with the company on January I. Mr. Kirkpatrick, who was connected with the Peerless Company for seven years, has not yet made an announcement as to his future plans.

J. N. Cross, for seventeen years associated with the Bay View (Milwaukee) mills of the Illinois Steel Company, has been appointed superintendent of the punch and press department of the new \$500,000 works of the A. O. Smith Company, manufacturers of pressed steel automobile frames and parts and complete cars, at Milwaukee, Wis.

S. J. Rowe, president of the Rowe Motor Company, of Waynesboro, Pa., has been for the past fifteen months designing self-propelled fire apparatus for the American La France Fire Engine Company, of Elmira, N. Y. Mr. Rowe has resigned his position, to take effect January I, 1910, and will devote his entire time to the business of the Rowe Motor Company.

Unit Coil Company Sue Cadillac.
The Unit Coil Company, of Jersey City,

The Unit Coil Company, of Jersey City, N. J., have brought suit against the Cadillac Motor Car Company, of New York, alleging infringement of patent No. 884,116, dated April 7, 1908, issued to E. Q. Williams and owned by the company. This patent is claimed to broadly cover the multiple unit type of coil. It is stated that patents Nos. 911,141, of February 2, 1909, and 928,204, of July 13, 1909, are also involved, the latter covering what is known as buckproof coils. As stated in our description of the 1910 Cadillac models some months ago, the company are this year using a novel coil system of ignition manufactured by a firm in Dayton, Ohio.

A street railway, operated by steam, has recently been installed between Mansville and New Orleans, La. The matter is of interest from an automobile standpoint, for the reason that a 30 horse power White steam engine and generator constitute the motive power of the vehicles, power plants of this description being fitted to the front of each of the cars.

### GARAGE AND SALESROOM.

### Dealers' Association Notes.

The Buffalo Automobile Trade Association held its annual meeting and election of officers at the rooms of the Buffalo A. C. last week. The following officers were elected: Chas. F. Munroe, president; E. C. Bull, vice president; Ralph E. Brown, treasurer; John J. Gibson, secretary. The election was followed by a banquet at the Peck café.

Seven representatives of San Francisco automobile dealers met on December 17 and issued a formal protest against the proposed increase in freight rates on automobiles shipped from the East.

The Philadelphia Automobile Trade Association has secured a lease on a portion of a new building now being erected at the southwest corner of Broad and Callowhill streets, which is almost in the centre of the automobile district on North Broad street. The premises will be used for clubrooms.

#### Garage Notes.

Long Beach, Cal.—Cook & Shields Auto Company, owners of the Pacific Garage, have taken a three years' lease on the two story, 50x150 feet garage in course of erection on Locust avenue, between First street and Ocean avenue.

San Bernardino, Cal.—R. F. Garner has been awarded a contract for the building of a garage on D street, between Fourth and Fifth streets.

Chicago, III.—The United Motor Company will occupy the entire building at 1507 Michigan avenue. They have taken the agency for the American and Sterling cars.

Chicago, III.—Richard C. Raddatz has obtained a permit to erect a brick garage at 530-32 Jefferson avenue, to cost \$4,000.

Chicago, III .- The Speedwell Motor Car Company have moved to 1407 Michigan avenue. The Speedwell Building, in course of erection at 2411 Michigan avenue, which is to be their permanent quarters, will be ready for occupancy about March 1.

Peoria, III.—Ray O. Becker, general agent for the Northwestern Mutual Life Insurance Company, has bought out the interest of J. F. Thacker in the Thacker-Brereton Company, the concern operating the White garage at 314 Fulton street.

Muscatine, la.—The Jackson Motor Company have erected a 60x112 feet, one story concrete garage on the corner of Iowa avenue and Fourth street, at a cost of \$5,000.

North Adams, Mass.—The Tower Motor Car Company have opened a salesroom and garage in the rear of the Hoosac Valley Savings Bank Block.

Minneapolis, Minn.—The Hughes Motor Car Company will erect a garage and charging station at Harmon place next

Minneapolis. Minn.-M. L. Hughes, of the newly organized Hughes Motor Car Company, has selected a site on Harmon place for the erection of a 165x66 foot garage and salesroom to handle the Rauch & Lang electrics. The estimated cost is upward of \$20,000.

Minneapolis, Minn.—The Parker Garage Company have asked permission of the fire department to sink a 500 gallon gasoline tank in the rear of their building at Tenth street and Mary place.

Kansas City, Mo .- Virgil Dodge has bought the interest of W. F. Tuttle in the Imperial Motor Car Company, and is now sole owner of the company. Mr. Dodge handles the Woods electric car.

Glendive, Mont.—The Velie Motor Car Company are erecting a 50x160 foot, two story and basement garage at Thirty-third and Main streets, which will be ready for occupancy by January 15. The company have acquired the adjacent property for additional buildings as occasion demands.

Holdredge, Neb .- The Velie Automobile Company will open a garage the first of the month. P. C. Anderson, of Omaha, will be in charge of the business.

Manchester, N. H .- The Red Arrow Garage, a new 150x45 foot brick structure, at 73-77 Lowell street, was opened for business last week.

Attica, N. Y .- Fred M. Broadbooks has several options on building sites on which to erect a garage, to be ready for the spring business.

Bryan, Ohio.-C. R. Bowersox has disposed of his interest in the Christman Garage Company to Philip Christman, Jr. Mr. Bowersox retains his agency business.

Columbus, Ohio.-At Norwalk, Ohio, the C. F. Jackson Company has purchased a site opposite the Avalon Hotel, on which will be erected a two story, fireproof garage, 60x80 feet. The structure will be of brick and steel, with concrete floors.

Philadelphia, Pa .- The Western Garage, at 220-222 South Fortieth street, has been sold to D. Webster Bell for \$25,000.

Chattanooga, Tenn.—The Chattanooga Automobile Company have added a sales and show room to their garage, besides space for the accommodation of ten additional automobiles.

Memphis, Tenn.—The Memphis Automobile Company will erect a 150x75 foot garage on the corner of Fourth and Monroe avenue, the first of the year.

Houston, Tex.—H. T. D. Wilson has made application to the City Council for permission to remodel the Bijou Theatre property into a garage.

Midland, Tex.—George D. Elliott and C. S. Reeves opened a garage on North Abilene street, near the depot. They will do business under the name of the Western Auto and Supply Company, and will carry a full line of supplies.

San Antonio, Tex.—A new two story and basement concrete fireproof garage, with a floor space of 23,220 square feet, has been completed on East Crockett street.

Salt Lake City, Utah.-A. H. Walsh has obtained a permit to build a garage in the rear of 1120 Second avenue.

Rutland, Vt.-W. C. Landon & Co. are remodeling the old laundry building on Evelyn street into a garage.

Janesville, Wis.-Baack, Reed & Gage Company is the name of a new concern which has leased the garage under construction for Wilson Lane, and will take occupancy about February I. J. E. Reed comes to Janesville from Madison, Wis., to take charge of the garage. The lines to be handled have not yet been announced.

Milwaukee, Wis .- The Hickman-Lanson-Diener Company's garage, at 222-6 Third street, was damaged by fire to the extent of \$2,000.

Wis.-The Bates-Oden-Milwaukee. brett Auto Company, 503-507 Broadway, Milwaukee, Wis., has purchased the entire interests of the George W. Browne Motor Car Company, Wisconsin street, Milwaukee. The Marion and Overland, carried by the Browne Company, are transferred to the Bates concern, which handles the Winton and up to now has had charge of the Buick George W. Browne will have charge of the wholesale business of the Bates Company, and Charles R. Johnson continues as city sales manager.

New Agencies.
CHICAGO, ILL.—The United Motor Co., 1997

Michigan avenue, American, CHICAGO, ILL.—B. C. Hamilton, 1218 Michigan avenue, Chadwick and Pullman.

SOUTH BEND, IND.—R. Z. Snell, 517 Michigan avenue, E-M-F "30."

MUSCATINE, IA.—The Heitz Machine Co.

Velie.

MINNEAPOLIS, MINN.—The Hughes Motor Car Co., Rauch & Lang electrics.

MINNEAPOLIS, MINN. - The Pagel-Allen Co., 1417 Hennepin avenue, Demotcar.

KANSAS CITY, MO.—Interstate Motor Co.,

2506 Grand avenue, Broc.

CANDO, N. DAK.—The Cando Auto and Thresher Co., Mitchell, De Tamble. KENMARE, N. DAK.-J. A. Englund, S. &

LAKOTA, N. DAK.-Interstate Motor Car Co.,

MEMPHIS, TENN.-Merriman Brothers Auto

Co., Third street and Washington avenue, Rapid. DALLAS, TEX .- The John Deere Plow Co., Elm street, Jackson.

HOUSTON, TEX.-The Auto & Motor Boat Co., Franklin.

SAN ANTONIO, TEX.—Birdsong & Potcher nick. Maxwell.

SALT LAKE CITY, UTAH.—The Consolidated Wagon and Machine Co., Overland.

BARABOO, WIS.—Protheroe & McHinnis Antomobile Co., Buick.

SUPERIOR, WIS .- The Ross Motor Car Co. Studebaker-Flanders and E-M-F.

### NOTES OF THE INDUSTRY AND THE SPORT.

#### Miscellaneous Notes.

The Wisconsin agency for the Zig Zag tire chain has been established at 500 Enterprise Building, Milwaukee.

The Warner Pole and Top Company, Cincinnati, Ohio, will move to their new quarters, where they will have greatly increased manufacturing facilities, about January 1.

The Twin City Taxicab Company, recently organized in Minneapolis, Minn., have placed an order for 85 cabs, 10 pleasure cars and two trucks with the American Locombtive Company.

The main building of the new Fiat automobile plant in Poughkeepsie, N. Y., measuring 275x375 feet, is now under roof, and the installation of machinery will begin about January 15.

The Kero-Car Motor Company is being organized in Dayton, Ohio, to manufacture an automobile propelled by a kerosene engine. The car can be operated on either gasoline, alcohol or kerosene, however.

The Mound City Buggy Company of St. Louis have decided to handle automobiles in connection with their horse drawn vehicles. Joseph A. Schlecht will look after the automobile branch of the company.

The Tanberg Auto Company, of Eau Claire, Wis., write to inform us that they are not handling the Overland line, as erroneously stated in our December 15 issue under New Agencies, but have taken on the Oakland.

We are informed that the Saurer trucks, which, as reported in our issue of December 15, won all four of the events in the French commercial vehicle trials in which they were entered, were all equipped with Eisemann magnetos.

The Buick Motor Company have begun the manufacture of double cylinder opposed delivery wagons in their plant at Jackson, Mich. The cars have a wheel base of 92 inches, a double chain drive and a carrying capacity of one ton. C. N. Wilt is factory superintendent and Stewart Schram business manager of the plant.

The Stewart & Clark Manufacturing Company, makers of Stewart speedometers, are opening branch offices on the Pacific Coast, one in San Francisco and one in Los Angeles, which will be in charge of Mr. Pelton, formerly sales manager of the Auto Vehicle Company of Los Angeles. The Stewart & Clark business on the Pacific Coast was formerly handled through Hughson & Merton.

The chauffeurs of St. Joseph, Mo., met at the premises of the St. Joseph Automobile and Supply Company on December 18 and formed an organization, to be known as the St. Joseph Chauffeurs' and Machinists' Association. Dallas McFall was made temporary chairman and Leland Scott temporary secretary. It is planned to have an

ordinance introduced in the City Council requiring all automobile drivers to pass an examination and take out licenses.

C. L. Kimball, Chicago, Ill., has acquired 300 feet on the southwest corner of Thirtyninth street on which will be erected an automobile factory.

The Wilcox Engineering Company, Saginaw, Mich., are erecting a new plant on Holland avenue, which will double their present capacity for the manufacture of automobile parts, etc.

We are informed that the Auburn Automobile Company, of Auburn, Ind., has made an increase in capital stock from \$25,000 to \$75,000. Charles Ekhart is president of the company.

The Pope Manufacturing Company, of Hartford, Conn., have declared a quarterly dividend of 1½ per cent. on their preferred stock, payable on January 31, to stockholders of record on January 21.

F. G. Miller and brother, garage managers at Defiance, Ohio, are building a number of cars, which will be placed on the market soon. It will be a gasoline touring car, but further announcement has not been made.

The Russel Wheel and Foundry Company, of Detroit, Mich., have purchased the A. P. Wagner Tool Works, which they will remodel for the manufacture of automobile parts. The building measures 150x200 feet.

The Sears & Scoville Company, Cincinnati, Ohio, are planning the erection of a four story concrete building as an addition to their plant in Brighton, to enable them to manufacture motor trucks on a larger scale.

A stock company is being organized by business men at Seymour, Wis., to manufacture trucks and pleasure cars. The property of the Dean Manufacturing Company has been leased, and the machine shops and foundry will be overhauled at once.

A number of the rubber and tire factories of Akron, Ohio, are preparing to participate in the All-American Exposition to be held in Berlin, Germany, August of next year. Secretary Stevens, of the Chamber of Commerce of that city, is looking after the matter.

The Parry Automobile Company of Indianapolis has closed a contract for 2,000 automobile bodies with the Roach-Brown Manufacturing Company, of Cumberland. They are to be delivered as fast as they can be finished. The Parry Automobile Company states it will manufacture 5,000 cars for the 1910 season.

Sears, Roebuck & Co., Chicago, Ill., have leased from the Grand Central Market Company a large building at the corner of Loomis and Harrison streets, erected two years ago for market purposes. The Sears-Roebuck firm will use the building for manufacturing automobiles. The dimen-

sions are 140x476 feet, and the lease runs for a number of years at an annual rental of \$14,000.

#### Club Notes.

Charles Y. Knight, inventor of the Silent Knight sliding valve engine, was to be the guest of honor at a luncheon given by the Chicago Motor Club on Tuesday.

The annual show of the A. C. of Maryland will be opened in the new Fifth Regiment Armory, Baltimore, on February 22, and continue during the remainder of that week.

The Quaker City Motor Club will hold its annual banquet at the Hotel Walton, Philadelphia, on January 6, at which a number of high State and city officials will be present.

Plans are on foot for the organization of a North Texas A C., to include motorists from Fort Worth and Dallas. If the plan goes through a country clubhouse and garage will probably be established at Dalworth, midway between the two cities.

The Chicago Motor Club has gathered statistics concerning the sales of cars in that city during the past year. It was found that eighty-nine different makes of automobiles are represented by eighty-four agencies and branches, and it is estimated that, including the contiguous territory, about 10,000 cars were sold.

At a recent meeting of the Chattanooga (Tenn.) A. C. plans were considered for the erection of signboards and the installation of telephone boxes at crossroads. Members of the club are to be provided with keys to the telephone boxes. For what purpose these telephones are to be used is not stated. Joseph H. Bucholz was appointed a committee of one to work the matter out.

The A. C. of Buffalo held its annual meeting on December 21, at which the following officers were elected: Laurens Enos, president; Harry Thorp Vars, vice president; Donald Mackay, treasurer, and Dai H. Lewis, secretary. The club now has 1,806 members, an addition of 632 during the year. A resolution was unanimously adopted, requesting that a brick pavement, 20 feet wide, be laid in the Williamsville road, between Buffalo and Williamsville, instead of the 16 foot pavement proposed by the State Highway Commission.

### New Incorporations.

The Sumter Motor Car Company, Sumter, S. C.—Capital stock, \$10,000.

The United States Auto Company, Cleveland, Ohio.—Capital stock, \$5,000. Incorporators, Elmer E. Robbins and others.

The Johnstown Motor Company, Johnstown, N. Y.—Capital stock, \$15,000. Incorporators, Chas. A. Miller, G. Hillabrandt,

Henry Veghte, D. A. Hays, E. L. Lucas, Jas. D. Pierson and Fred L. Carroll.

Chalmers-Hipple Company, Philadelphia, Pa.—Capital stock, \$50,000. Incorporators, Geo. G. Hipple, F. C. Vaughn and others.

The Mason Automobile Company, Waterloo. Ia. (formerly of Des Moines).—Capital stock increased from \$250,000 to \$1,000,000.

The Glidden Motor and Supply Company, Brooklyn, N. Y.-Capital stock, \$10,000. Incorporators. William W. Southworth and others.

Broadway Automobile Company, Oklahoma City, Okla.—Capital stock, \$25,000. Incorporators, C. B. Pope, C. W. Talbot and Ray Colcord.

Shafer-Goode Motor Company, Los Angeles, Cal.-Capital stock, \$40,000. Incorporators, Wm. B. Goode, Wm. A. Shafer and Alfred L. Sohm.

The White Garage Company, Oklahoma City, Okla.—Capital stock, \$25,000. Incorporators, J. E. Crawford, L. C. Towler and H. A. Mason.

Commercial Motor Company, Denver, Col.—Capital stock, \$25,000. Incorporators, H. T. Hill, Samuel Norman and P. R. Harfler.

The Memphis Automobile Company, Memphis, Tenn.—Capital stock, \$70,000. Incorporators, S. T. Carnes, N. C. Perkins, J. W. Falls, A. H. Dorsey and William H. Gates.

Kokomo Motorcycle Company, Kokomo, Ind.—Capital stock, \$100,000. Incorporators, W. H. Gilman, J. D. Kennedy, L. C. Woodhill, G. W. Charles and E. A. Mc-Guire

The Dothan Auto and Garage Company, Dathan, Ala.—Capital stock, \$10,000. Incorporators, A. J. Smith, Rouse Smith and E. A. Smith, of Tallassee.

The Olds Oaklane Company, Philadelphia, Pa.—Capital stock, \$25,000. Incorporators, C. W. Odell and others. To deal in automobiles and aeroplanes.

Loop Garage Company, Chicago, Ill.-Capital stock, \$2,500. Incorporators, J. J. Downey, J. H. McGay and John E. Spriggs.

The Hughes Motor Car Company, Minneapolis, Minn.-Capital stock, \$50,000. Incorporators, M. L. Hughes and others.

### Columbus, Ohio, Automobile Show.

The first automobile show held in Columbus. Ohio, opened in a blaze of lights, and with much ceremony at 8 o'clock Christmas evening, when Governor Judson Harmon turned the electric switch which opened the show. The Columbus Automobile Club, a large and flourishing organization of Columbus motorists, is behind the show, which is being held in the Columbus Auditorium, one of the largest halls in the Middle West. The entire interior of the hall is covered with white bunting, trimmed with red. Artificial palms, orchids and other plants are placed at frequent intervals, and they are surmounted with myriads of variously colored electric lights, which give the effect of natural flowers. Opposite the entrance is a huge automobile wheel fashioned out of electric lights.

A total of 134 motor cars are exhibited by several score of dealers and agents. Practically all the cars represented in Columbus and central Ohio are on exhibition. All the cars are of 1010 model, fresh from the factories. Many new features are displayed, and interest in every direction is at a high point. One of the features of the decorations is a large number of canary birds. which have been secreted in the tops of the artificial shrubbery. When the lights were turned on the birds began to sing. This feature is one of the many novelties of the Columbus motor show. The attendance the first night was all that could be desired, and society turned out in full force. The exhibition will continue for one week. One of the novelties planned for New Year's eve is the placing of reeds on the horns and in that manner usher in the New Year.

### Eddie Bald Rejoins Columbia.

Eddie "Cannon" Bald is back to his first love, behind the wheel of a Columbia motor car again. The Columbia was Eddie's first motor love, just as the Columbia bicycle was Eddie's mount in the days when he was the international cycling champion. When Bald first became associated with motoring he sat in racers built for him in the Columbia factory at Hartford, Conn., following an apprenticeship in the Columbia factory. Bald's track generalship won him many events, and he also drove in one of the record breaking Columbia dashes from Chicago to New York. Bald is now associated with the agency for Columbia cars in Pittsburg, which city is now his home.

#### Indianapolis Dealers Elect.

The Indianapolis Automobile Trade Association last week, at one of the daily poon luncheons of the "Flat Tire Club," a social organization composed in part of the members of the former, took the first steps toward preparing for the annual Indianapolis Automobile Show by the election of new officers to pilot its fortunes. The election resulted as follows: President, Fred I. Willis, of the Hearsey-Willis Company; treasurer, Frank L. Moore, of the Fisher Automobile Company; secretary, Frank B. Willis, of the Willis-Holcomb Company.

### Patents Issued October 12, 1909.

936,284. Friction Clutch Electric Control.— Harry M. Abernethy, Cleveland, Ohio. Filed April 3, 1909.

936,291. Gearing.-John W. Belyeu, Alexander City, Ala. Filed November 10, 1908. 936,300. Speed Changing Mechanism.—Fred-

erick C. Brunhouse, Philadelphia, Pa. Filed January 13, 1909.

Lifting Jack .- John E. Crowle, Bal-016.100. larat, Victoria, Australia. Filed September 9,

936,338. Power Transmission Mechanism.-Benjamin F. Mayo, Salem, Mass. Filed December 9, 1905.

Roller Bearing .- Henry V. Smith, Bridgeport, Conn., assignor of one-half to Eugene H. H. Smith, Bridgeport, Conn. Filed January 11, 1909.

936,513. Vehicle Seat.-Judson Benson, Ames bury, Mass. Filed December 12, 1908.

936,530. Permanent Magnetic Metal.--Samuel Gertler, New York, N. Y., assignor to Charles F. Splitdorf, New York, N. Y. Filed March 9.

Automobile.—Bernard A. Alnevin 936.505. New York, N. Y. Filed March 13, 190

Electrical Coil,-Maurice C. Rypinski, 936,669. Pittsburg, Pa., assignor, by mesne assignments to Westinghouse Electric and Manufacturing Co. East Pittsburg, Pa., a corporation of Pennsylvania. Filed November 18, 1907.

p36,692. Commutator Brush.—Vincent G. Apple, Dayton, Ohio. Filed July 7, 1906.
936,694. Reversing Mechanism.—Frederick J. Ball, New York, N. Y., assignor to New York Gear Works, Brooklyn, N. Y., a copartnership. Filed January 31, 1908.

936,750. Supplemental Wheel for Motor Cars. -Arthur E. Whitney, Winchester, Mass. Filed June 22, 1908.

Air Compressor .- Edward J. Rohr-936,813. bacher, Blaine, Wash. Filed January 4, 1909.

936,837. Tire.—Henry L. Walbridge, Spring-field, Mass., assignor to the Chandler Co., Springfield, Mass., a corporation of Massachusetts. Filed

August 24, 1907. 936,845. Motor Cycle Attachment.—Henry T. Adams, Chicago, Ill. Filed December 5, 190

936,866. Attachment for Automobiles.-Henry S. Delamere, Ferndale, Cal. Filed August 21,

936,872. Compression Grease Cup.—Louis W. Durst, Philadelphia, Pa. Filed March 31, 1909. 936,932. Air Compressor.—Arthur Neumann. St. Louis, Mo., assignor of one-half to Daniel F. Behrens, Clayton, Mo. Filed April 28, 1908.

936,964. Starting Device for Explosive En gines.-Harry Wayte, Milwaukee, Wis., assignor to Meyer Desenberg, Jr., Kalamazoo, Mich. Filed January 5, 1906. Serial No. 294,700. Renewed Tuly 0, 1000.

Speed Changing Mechanism.—William 937,034. A. Pringle, Niagara Falls, N. Y., assignor to the Carter-Crume Co., Limited, Niagara Falls, N. Y., a corporation of Canada. Filed January 19, 1907.

### Patents Issued October 19, 1909.

937,127. Means for Starting Internal-Comb tion Engines.-William B. West, Columbus, Mo. Filed January 28, 1909.

937,211. Automobile.—Henry K. Holsman, Chicago, Ill. Filed January 18, 1907.

937,212. Braking Mechanism for Automobiles. Henry K. Holsman, Chicago, Ill. Original application filed January 18, 1907, Serial No. 352,-848. Divided and this application filed February 1. 1900.

937,321. Speed-Changing Mechanism.—George D. Munsing, Hoboken, N. J. Filed February 8,

Electric Battery.-Maurice Nicolas, 937.324. Paris, France. Filed February 21, 1907.

937,522. Ignition Apparatus.—George Haniquet, Longbeach, Cal. Filed June 11, 1908.

Grip-Tread for Vehicle- Wheela-937,528. Frank Holan, Niobrara, Neb. Filed February a, 1000.

Clutch Mechanism.-Vinezent Szües, 937,536. Barberton, Ohio. Filed July 13, 1909.

937,586. Storage Battery.-Louis H. Flanders, Wilkinsburg, Pa., assignor to the Westinghouse Machine Company, a corporation of Pennsylvania. Filed August 6, 1904.

937,699. Circular Receptacle for Automobiles.

—George V. Hagerty, New York, N. Y., assignor to National Enameling and Stamping Company, a corporation of New Jersey. Filed July 29, 1909.

As last year, the Grand Central Palace Show will be formally opened on Friday afternoon by Patrick F. McGowan, who will be acting mayor of New York on the last day of the year.

# Horseless Age

VOLUME 24

NEW YORK, JULY 7, 1909

NUMBER 1

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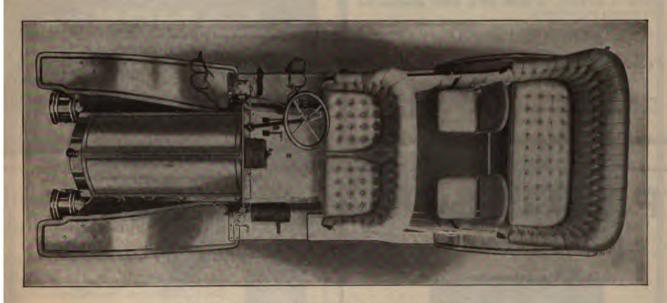
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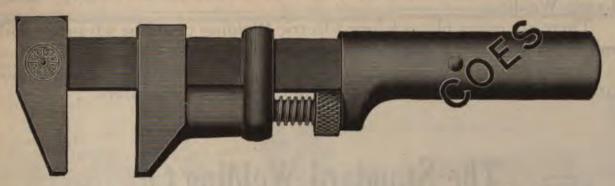
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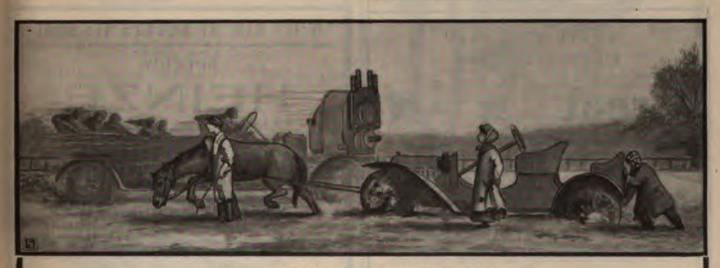
THIS cut shows the Allen-Kingston car taking a very bad right angular curve at Sport Hill Climb, Bridgeport. The car traveled at a speed of fifty miles an hour, and photograph shows the skidding of the rear wheel just before righting for the finish and winning its class event.

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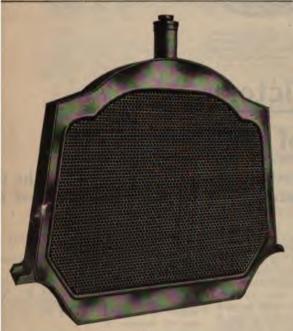
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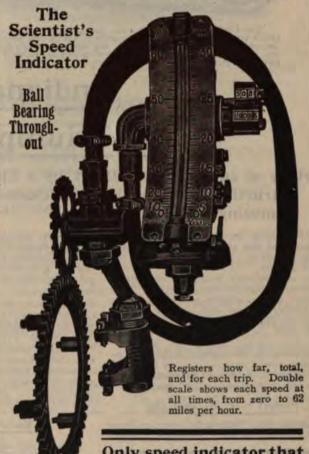


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FORM D or DASHBOARD ODOM-BTER. Complete with flexible shaft and attaching fixtures, ready to put on any car, \$20.00

1910 Model, \$1,500



incre-Detroit "30," co10 Model, has a 115-inch wheel base. That's three inches our "Forty" of last season. It has 34-inch wheels, against 32-inch last season, more roomy and stylish, the hood accordingly longer and higher. This amazing the lines of the costlict cars—showy, roomy, long, luxurious—sells again this .500.

### Indiana Victory A Triumph of Worth

Capture of cup at Crown Point by a Chalmers-Detroit "30"-a victory for the construction, workmanship, mechanism, material—the power, the vitality of this amazing \$1500 car.

On June 18 at Crown Point, Indiana, sig-nal proof of the astounding value in the Chalmers-Detroit "30" was added to the

Chalmers-Detroit "30" was added to the record of 1909.

For Joe Matson's first place in a Chalmers-Detroit "30" in the great race there that day was no chance winning.

A victory for his skill, it was tremendously a triumph for the car. The car that could seize the laurels in that grueling stock car contest had to be a master achievement in mechanism material conachievement in mechanism, material, con-struction, power, speed—above all in sound-ness, ability to withstand punishment. The Chalmers-Detroit "30" won.

### Perfect Car Mechanically

Broken parts, faulty lubrication, a loose connecting rod, a leaky valve—in a word,

A Memo to Chalmers-Detroit Motor Co., Detroit, Mich. Please send catalog to
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Address
City
County State
HORSELESS AGE, NEW YORK.

any defect-would have been fatal. A per-fect car mechanically was demanded.

The Chalmers-Detroit "30"—a stock car
—won. It is the same car any man would
get who purchased a Chalmers-Detroit "30"

The Chalmers-Detroit "30" was a new car only a year ago. One could judge it only by the splendid records of the Chal-mers-Detroit "Forty."

Its main prestige lay in the fact that Mr. Coffin designed it—the man who designed our "Forty." But \$1,500 was a new price—an amazing price. And all the world wondered what sort of car it would buy. Now the records are in.

### Records of 1909

One of our "30's" has been run more than 32,000 miles, including the path-finding trip from Denver to Mexico City. Never has any car at any price made an equal endurance record.

Owners have paid us for repair parts on all cars shipped during the year just passed, exactly \$2.44 per car. We believe that's an-other world's record.

In the Economy Test, made in New York by the New York Auto Dealers' As-

sociation, our "30" made 25.7 miles on a gallon of gasoline.

On a long distance road race its average speed was 51.5 miles per hour.

Never did a car prove more satisfactory. Never did a car cost so little for upken. Mr. Coffin has devoted another year to its study. Yet he has found no mechanical way to improve it. way to improve it.

### No Question of Choice

The tide of automobile demand is turning to these medium-priced cars. Not alone because of their moderate cost, but mainly because of their low cost and upkeep.

Most men find in the Chalmers-Detreat "30" all that they want in a car. And so

"30" all that they want in a car. And so price can buy more than we give in our "Forty" save unneeded power.

Last season the cars had no real competition. This season we have doubled their sightliness without adding a penny of cost. We have even reduced the price by adopting the policy of furnishing the catras, at the lowest possible cost—must cheaper than you could buy them, excepting from us.

There can be no question of choice. There is nothing on the market which begins to compare with the value one gets in these cars.



The "30" Limousine

Finished in superfine Waterloo broadcloth, Price \$3,750, including Magneto, Gas Lamps, Tank, Vases, Toilet Case with hand mirror, French plate glass and every other possible refinement.



The "30" Roadster, \$1500

The "Forty" is made in this style, too, at \$2,750.

Chalmers=Detroit Motor Co.



The Chalmers-Detroit "Forty," 1910 Model, has a 122-inch wheel base—ten inches longer than last season. It has 36-inch wheels—two inches larger than last season. Upholstered in hand-buffed leather. Magneto free. You should see this car. With all the costly improvements price still remains \$2,750. Two extra seats, making it a seven-passenger car, cost only \$75.

### Our 1910 Models on Show in July

So the 800 people disappointed in not getting the 1909 models can secure the new cars four or five months before the calendar year begins.

When the people awoke to what an amazing car for the money we had created in the 1909 Chalmers-Detroit "30," we couldn't hope to supply the demand.

In its first season we turned away orders for 800 cars of this model—representing \$1,200,000.

Now we announce our 1910 models, on show in July.

Deliveries will begin about August 1st. Get your order in now with your dealer.

For, although we have increased our output for 1910 by 1,000 cars, last year's record indicates we will still be unable to

### Larger Cars-Same Price

In 1910 we give you even more for the money than before.

Our new Chalmers-Detroit "30"—our \$1,500 car—will have a 115-inch wheel base. That's three inches longer than our 1909 "Forty." It will have 34-inch wheels—two inches larger than last season. The hood will be three inches longer and two inches

higher—in keeping with the larger body. The tonneau will be large and roomy. And not a car on the market, regardless of price, will have a more stylish body.

Our 1910 "Forty" will have a 122-inch wheel base—ten inches longer than last season. It will have 36-inch wheels. Our new "Forty" will be upholstered in hand-buffed leather, and a Bosch Magneto will be furnished free.

Yet, with all these costly improvements, not a penny is added to the price of either car. Two extra seats in the "Forty" Tonneau, making it a seven-passenger car, will cost only \$75.

### Profit Still Nine Per Cent.

Our profit for 1909 was approximately 9 per cent. For 1910 we figure it will be about the same. Cost of materials has advanced \$75 to \$100 per car. Yet we have more than offset this by increasing our capacity by 1,000 cars.

These 1,000 additional cars will be produced without a dollar's extra cost for man-

agement, advertising or overhead expense. Our fixed expense last year was divided by 3,000 cars. This year it is divided by 4,000 cars.

Then, our cars of last season were mechanically perfect—so are not altered mechanically. Therefore, the same tools and machinery serve for another year.

#### Saving Goes Into the Cars.

Every penny we save in these ways goes to increase the beauty of the cars.

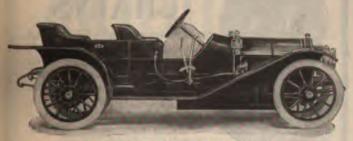
to increase the beauty of the cars.

The saving is all spent for size and style and room.

Chalmers-Detroit cars will always give all the value possible to give and retain what would be a fair profit in any business. For 1909 the utmost worth was given. For 1910 a beauty of line beyond compare is added.

Look at the lines of the 1910 models. There are no handsomer cars at any price.

Send now for our new catalog showing the 1910 improvements. Then let our nearest agent show you the cars themselves.



"Forty" Pony Tonneau, \$2,750

Same style in the "30" also, at \$1,500.

Detroit, Mich. Licensed Automobile Manufacturers



The "30" Inside Drive Coupe

Detachable body—Roadster in summer if desired. Ideal for physicians and others wanting all-year-round business use of car. \$2,100, including Magneto, Gas Lamps and Tank.

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Everywhere automobile owners and prospective buyers are coming to realize the handicap of water-cooling complication over aircooling simplicity.

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Which is the best plan of construction, an automobile free from complication, every feature simplicity itself, or an automobile having complication that not only requires attention but which is liable at the most critical moment to cause trouble?

There is no part of the Franklin that is complicated. Every unit of the automobile is built with a view to simplicity, long and satisfactory service.

The man who buys a Franklin purchases ability and comfort—and that is what you want.

Write for our new catalogue.

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Hochactungsvoll, ADAM OPEL.

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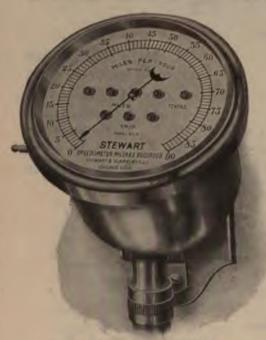
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Try the Multipolar for thirty days and learn from your own personal experience why most car owners are reading their speed from these accurate instruments.

The speedometer that always tells your true speed—the Stewart Multipolar. Get one. Most dealers handle Stewart Speedometers exclusively.

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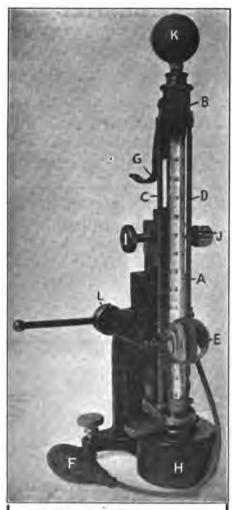
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Randall-Faichney Co		. –
Rajah Auto Supply Co		
Regal Motor Car Co		. –
Remy Electric Co		
Rex Wrench Co		
Royal Equipment Co	• • • •	. 21
Schacht Mfg. Co		
Schug Electric Co	• • • •	· _
Shaler Co., C. A	• • • •	. 22
Shore Instrument & Mfg. Co	• • • •	
Smith Co., A. O		
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The Standard Ignition System "Bosch Equipped Cars" get there and get back always.

Wherever "Quality," 'Endurance" "Reliability" and "Power" are required, the Universal selection is the Bosch.

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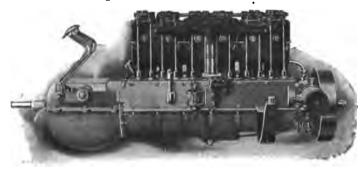
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Then get a P. T. C. Power Tire Pump to keep your tires in shape.

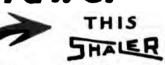
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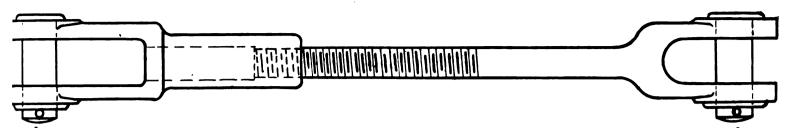
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You use Yoke and Rod end assemblies—and we make them by electrically welding A L A M and other standard forgings to rods of good quality. This is the most satisfactory method of manufacturing these parts both for quality and cheapness of production, quality considered.

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New York: Dear Sir-You ask for our opinion in regard to Splitdorf Plugs and Magne-tos. We wish to say that we have never yet seen a Magneto that is in the same classasthe Splitdorf Magneto, and as to the Plugs, would state that we have never sold a Plug to anyone who has

We have placed over thirteen E-M-F cars here, all of which are equipped with your ignition and none of them has ever had the least ignition trouble, and to our knowledge there isn't a single owner who owns an extra Plug.

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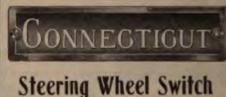
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You have only yourself to blame if you have ignition troubles of any kind when the SPLITDORF Magneto and Common Sense Plugs will cut them out entirely.

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Your Battery or Magneto from the Steering Wheel

Control



Control of your ignition under your thumbjust where it ought to be.

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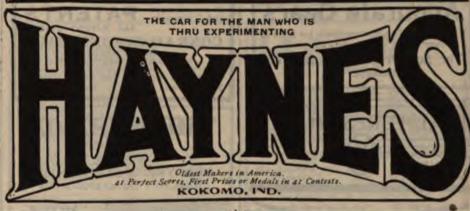
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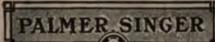
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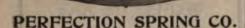
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202 Motor Mart Building, New York City. Boston Branch, 889 Boylston St. Chicago Branch, 1218 Michigan Ave-Pacific Coast, 24 Stanyan St., San Francisco, Cal. Canada, The T. Enton Co., Toronto, Canada.



Heat which recently melted the metal boxes in an automobile owned by Maloney & Kratky, Cairo. Ill., did not injure Non-Burn Asbertos Brake Linino in the least. The flame of a blow torch will not even burn it. If Non-Burn will stand such severe tests, how could heat caused by friction burn it. The intense heat caused by friction when stopping an auto quickly chars and burns leather, cork, camel's hair and other organic linings. And after that their gripping power is gone and they soon go to pieces. Rub your hand over a charred piece of any organic lining and see how smooth it is,—bend it and see how easily it breaks.

Write for sample of Non-Burn and put it to any test you like.

Sample and Booklet Sent Free

Sample and Booklet Sent Free

#### H. W. JOHNS-MANVILLE CO.

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To clean up Surplus Stock

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**Automobile Supplies** and Accessories

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CONTINENTAL MOTOR MFG. CO., Muskegon, Mich. K. Franklin Peterson, Western Representative, 166 East Lake Street, Chicago,

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PACKARD "THIRTY" PHAETON





Packard Motor Car Company
Detroit, Michigan

# Do You Belong to the Maxwell" Family?

MAXWELL owners are a contented lot—for theirs is a car to ride in, not to tinker over.

An owner's verdict is the final analysis of the value of an automobile. Since there are 14,600 satisfied MAX-WELL owners it would be an easy matter for you to get an unprejudiced opinion.

The tour of the Maxwell Briscoe Motor Club is an indication of the confidence MAXWELL owners place in their car.

Over 30 MAXWELLS assembled at Columbus Circle on June 14th for a week's tour through the Berkshire Hills of Massachusetts, and over the roads of New York, Connecticut, Pennsylvania and New Jersey—a thousand miles in all.

MAXWELL owners feel the spirit of co-operation extended them by the men who make the MAXWELL.

Why don't you join the MAXWELL Family? Let me send you our catalog and other literature.

Yours very truly,

Benj Briscoe

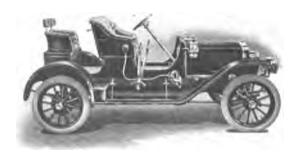


MODEL A-2 CYL, 10 H. P.-\$550.

This standard American runabout costs only \$550. It incorporates all the MAXWELL principles that have made these cars famous the world over. Equipped as per illustration with long fenders and running boards, oil lamps, etc.

MAXWELL JUNIOR, \$500.

Equipped with plain mud guards only, oil lights, etc.



MODEL K. A .- 4 CYL. 30 H. P .- \$1,750.

A gentleman's roadster of "class," equipped with gas lamps, generator and magneto. Same chassis as famous 10,000 mile Non-Stop car.



MODEL D. A.-4 CYL. 30 H. P.-\$1,750.

A powerful five passenger touring car, combining MAXWELL reliability with speed and comfort. Duplicate of the world's record holding, 10,000 mile Non-Stop MAXWELL. Equipped with gas lamps, generator and

MAXWALLS range in price from \$500 to \$1,750. From a 2-cylinder, 10 H. P. runabout to a big 4-cylinder, 30 H. P. touring car or roadster. One of our six models will solve your automobile problem.

#### MAXWELL BRISCOE MOTOR CO.

P. O. Box 107, TARRYTOWN, N. Y.

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Pawtucket, R. I.

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# layo Radiator are ARTH MAN OLPHIATA Æ.

Most of the High Grade Cars built in America use

### MAYO RADIATORS

as regular equipment.

Send for Catalog Showing 1909 Designs

MAYO RADIATOR CO., New Haven, Conn.

# Horseless Age

VOLUME 24

NEW YORK, DECEMBER 29, 1909

NUMBER 26

### Original and Genuine





THAT SWELL FRONT

### First Choice for First Place on Best Catalogs See Them at Booth 194, Grand Central Palace

No other lamp is made of double metal—it is made of two shells, each supporting the other, with all couplings on the inner one, and has twice the tensile strength of any lamp of equal size made.

No other lamp embodies those all important essentials—strength of construction, power of light and elegance of design—to such perfect satisfaction, and the more one knows about lamps the more these requisites appeal to him.

JOBBERS--Our Agency proposition for Nineteen-ten is just as attractive as the lamp itself.

### Manhattan Screw and Stamping Works

West End Avenue, New York

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**GRAND GENTRAL PALACE SHOW NUMBER** 

### The Spray Nozzle

In the centre of the hemispherical bowl-shaped float chamber of the

### SCHEBLER CARBURETOR

Prevents variation in the quality of the mixture necessary at all speeds.

This spray divides the gasoline into an infinite number of drops, giving the maximum amount of surface for vaporization.

A single drop of gasoline will not vaporize as rapidly as the same drop divided into an infinite number of particles.

The suction can then draw the vapor thus formed from the nozzle, uniting it with the air, forming a gas of the proper consistency.

Which is delivered to the cylinders for the speed you are running at,

Making them act in a perfectly uniform torque.

### Wheeler & Schebler

MANUFACTURERS

Indianapolis Indiana





The car with the long stroke motor, 6½ in., smooth and powerful, a marvelous hill climber. Entirely new model specially built for this country, with straight front axle and 10 in. clearance.

Other New Types: The 18-24 "Little Six" Chassis at \$4,750, and the 10-12 "Miniature Tour" Chassis at \$2,500

Before Placing Your Order for the Next Season

### See the New 1910 Renaults

at the Grand Central Palace (New York), December 31st to January 7th

The Renault has fully demonstrated that it is built for use on the roughest roads of United States. Besides t is the only car "guaranteed for life" against any defect in manufacture or workmanship. No other manufacturers have ever had enough confidence in their cars to do it.

Perfect Score: New York Herald Good Roads Tour, "New York to Atlanta, Ga."

Perfect Score: Munsey Reliability Run, "Washington, Boston and return."

Perfect Score: Auto Club of Hartford Endurance Contest, "three day run."

Perfect Score: Midwinter Endurance Run, "New York to Boston."

100 Mile World's Record, at Ormond, in 72 minutes 561/2 seconds. 821/2 miles per hour.

12 Hour World's Record (stock car), 613 miles. 51 miles per hour.

24 Hour Race (non-stop), 1,050 miles (Brighton Beach).

### Renault Frères Selling Branch

AUL LACROIX, General Manager

Broadway and 57th St., New York

BRANCHES: 1606 Michigan Avenue, Chicago. 316-322 Van Ness Avenue, San Francisco

#### AGENCIES !

England: A. C. Morse, Motor Mart, Boston.

Baltimore: L. H. Shaab, 116 W. Mt. Royal Ave. Portland: T. A. Bennett. Los Angeles: R. T. Leavitt.

The Bridgepor Vehicle Co., Bridgeport, Conn New Orleans: M. G. Bernin, 989 Perdido St.

In writing to advertisers please mention THE Horseless Age.



### Remy Magneto Under Water for Hours

Required no adjustment. Batteries not needed. Success of this record trip from Coast to Coast largely attributed to perfect results of Remy Magneto.

REMY ELECTRIC COMPANY, Anderson, Indiana:

Gentlemen—Referring to the trip made with the Regal "Plugger" from New York to San Francisco, in which we lowered the touring car record from Coast to Coast, I wish to say that your magneto proved satisfactory in every way; no adjustments of any description were made and no attention paid to it whatever, and yet it never failed to give results.

We used no batteries on the entire trip, starting entirely on the magneto, and although at times the entire engine was submerged in water for hours, we noticed no effect whatever on the magneto, or the result given from the same. We attribute a great deal of our success on this trip to the fact that we had no trouble what ever with your magneto.

Wishing you every success, and trusting that should I again make such a journey I may have a car as good as the Regal "Plugger," and that it will be equipped with a Remy Magneto, I am, Very respectfully yours; (Signed) WILLIAM H. SMITH.

### Over 100,000 Remy Magnetos Sold for 1910

Not a quantity user who helped make our immense 1909 season but that has adopted the Remy for 1910, besides many manufacturers have adopted the Remy for 1910 who formerly used other magnetos. Our factory is the largest and best equipped plant in the world devoted exclusively to magneto manufacturing. Dept. 10,

### REMY ELECTRIC COMPANY, Anderson, Indiana

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cobe Trophy Won b the Ald of the Remy Magneto



### 800 Owners in New York City

attest the high segard in which the Rainer car is held in the mount discriminating market in America. This pegard has been won by the semantable regularity and consistency on the road. It is example and effective in operation and singularly free from mechanical desiresof any surt. It has speed, endurance and power to climb any hill. It is allent, comfortable and easy riding. In short, in the hands of owners

### It stands the test of service



50 H.P., Guaranteed free of repairs for one year, \$4,500

#### Its competitive record in races is remarkable

It won the Atlanta Trophy, the most coveted prize of the year, and covered 200 miles without a stop in 178 minutes, an average speed of 70 miles an horn. In the 24-hour race at Brighton Beach, in which it finished third, it surpassed the record for 24 hours' continuous running, covering 1115 miles, and haroke a former record for an hour's running, covering 57 miles. It made new records for 180 to 200 miles at Atlanta, finished second in two other 24-hour ranes at Brighton, and second at Riverhead. It won twice at Atlanta and twice at Danbury. In no event has it failed to finish. This record was madeby

#### A 50 Horse Power Rainier Stock Car

For desirable Agency Territory address Sales Dept. H.



### DELIVERY PROMISES?

Are Always Exacted and Always Made, But Are They Always Held?

# The Value of a Delivery Promise Resides in the Reputation of Its Maker

That reputation can only be founded on previous experience. For the benefit of newer and possible customers—our old ones know by experience with us—we attach report of an examination made by certified public accountants of the quality of our deliveries.

Philadelphia, October 30, 1909.

#### Messrs. THE HESS-BRIGHT MANUFACTURING COMPANY

21st Street and Fairmount Avenue, Philadelphia

Gentlemen

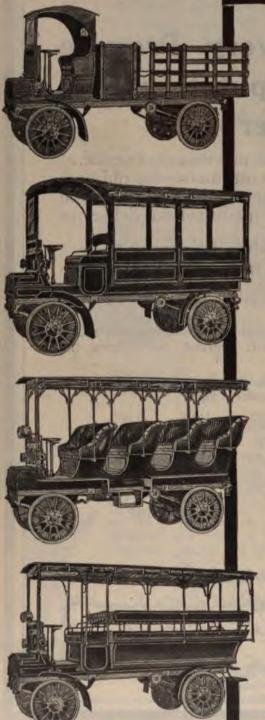
In accordance with your instructions to examine and compare you actual deliveries with your promised deliveries and report thereon, we submit the following as our findings:

Percentages of Prompt and Overdue Deliveries on your total Orders for Ball Bearings for the years 1907, 1908 and the first nine months of 1909

	1907	1908	1909
Deliveries made on time or in advance	Per Cent. 88.29	77.43	Per Cent. 88.03
Deliveries less than 10 days late	4.42	9.44	6.69
Deliveries less than 20 days late	2.57	4.37	2.78
Balance	4.72	8.76	2.50
Total	100.	100.	100.

Respectfully submitted,

### It Will Pay You to Examine BOWSK OWE WAGONS



### If You Are a Dealer

protecting your future by looking for a good commercial car, you should not leave the show without spending time at the Grabowsky exhibit to thoroughly examine and understand this extraordinarily successful power wagon.

The Grabowsky car has a record that is a big asset to the agent who is fortunate enough to get it for his

The Grabowsky can point to a record of hundreds of cars in successful operation in every part of the United States.

Mr. Max Grabowsky, who designed the Grabowsky car, is widely known

in the automobile world as the pioneer designer of commercial cars in this country, and his various designs have all been stamped with the approval of success. In this his latest production, he has introduced refinements and original ideas of construction that have all dealers. tion that have cleared away all doubts as to his leadership as a designer

#### Grabowsky Power Wagons are made to meet every business requirement. They range in capacity from one to three tons.

We design and build special bodies to meet every individual requirement. With the Grabowsky agency you need fear no competition.

If you are a business man, looking for the best car to reduce the expense of hauling and delivery, you will be well repaid for the time you spend in examining the Grabowsky.

You will find a car of original design, and dependable construction, built to stand up under the most severe operating conditions.

vere operating conditions.

The Grabowsky is not only built for strength and reliability, but is especially recommended for low cost of maintenance.

The following unique and essential

features of construction can be found in no other car.

The Removable Power plant, which The Removable Power plant, which slides in and out like the drawer of your desk, making quick inspection and adjustment easy at all times.

Hardened Steel Bushings, placed on every wearing part, prolong the life of the car indefinitely.

The emergency condensing chamber in the radiator, that makes superheating impossible.

heating impossible.

The Positive Mechanical Oiling System that consumes less oil than that of any other car of equal power. Our Service Bureau will gladly give details on the cost of equipment and maintenance, without cost.

### GRABOWSKY POWER WAGON CO.

86 Champlain St., Detroit, Mich.

We Will Exhibit at the Grand Central Palace. New York, Opening New Year's Eve.

### The FIRST High Tension Magneto



December 29, 1909.

ever used on a motor was the EISEMANN. Today it still stands FIRST in mechanical construction and reliable operation.

Model Factories, a large staff of Skilled Designers and Engineers always on the lookout for improvements, the Most Expert Workmen in the world, the



Care used in selecting only the Highest Grade Materials and in Supervising Construction, have made the name

### **EISEMANN**

### SYNONYMOUS EX

### **EXCELLENCE**



Their Simplicity and Self-maintenance have won the praise and patronage of the public. Their Scientific Correctness of Construction and their Proven Value as the life-giving factor on automobiles, motor boats, aeroplanes, etc., have won the judgment of the foremost gas engineers. They are in daily use on



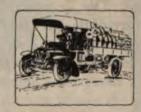
the highest class cars in Europe and America.

### Recent Notable Victories of the EISEMANN MAGNETO

At Indianapolis, Lewis Strang in a Buick, using an EISEMANN MAGNETO, made 100 miles in 92 minutes. C, The Panhard-Tellier, Europe's greatest motor boat, equipped with an EISEMANN



MAGNETO, has for four successive years won the World's Championship. The Dixie II, America's greatest motor boat, equipped with an EISEMANN MAGNETO, holds the World's Record for the Fastest Mile in Competition. C. Count De Lambert in a Wright Aeroplane, using an EISEMANN MAGNETO, made a flight over the city of Paris and around the Eiffel Tower at a height



of 1,300 feet. The flight covered 31 miles in 49 minutes 39 2-5 seconds. In the Commercial Motor Car Competition at Paris, held by the Automobile Club of France, from October 15th to November 15th, 1909, the Saurer Truck, equipped with an EISEMANN MAGNETO, was the only car to win first place in every one of the four classes in which it was entered, thus winning the medals offered by the Minister of Agriculture and the Minister of Public Works.

Write us for further facts about the EISEMANN the magneto with "the spark that never fails."



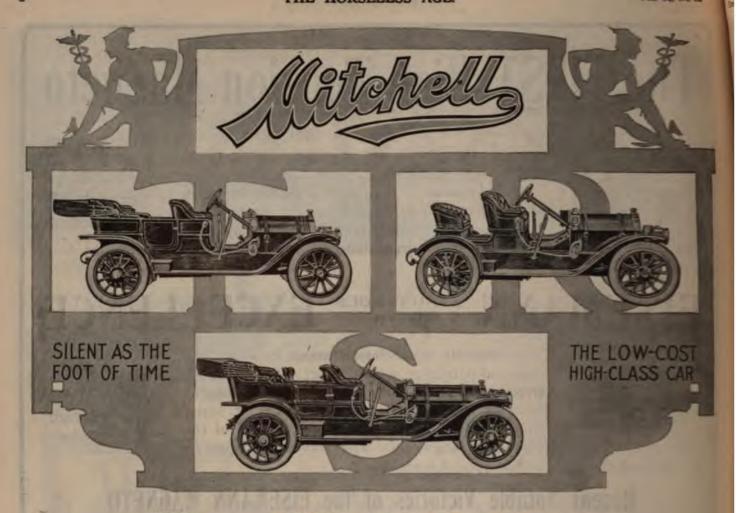
### LAVALETTE & COMPANY

225-227 West 57th St.

New York City

See our Exhibits at the Grand Central Palace Show, Second Balcony, West Side. Madison Square Garden Show, Balcony and Third Tier, 27th St. Side.





### The Mitchell Line

The remarkable construction of these cars—the simplicity of motor, strength of frame, beauty of design and finish, utterly noiseless engine, standardization of parts and attention to those things which are dear to the public heart, as well as the fact that although sold at low cost they are made of the very finest materials the world affords, have all served to create enthusiasm of extraordinary character. Hence the demand is far greater than the supply. The output for 1910—6,000 cars—was sold months ago, and since then we have had orders for so many more that if we could produce 10,000 cars we could sell them by wire in 48 hours.

The entire line will be exhibited at the New York Show beginning at the Grand Central Palace, December 31—Section 6, Space 22, Main Floor.

Mitchell Motor Car Co.-Racine, Wis. W. S. A.

PARIS BRANCHES: 4 AVENUE MACMAHON

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Economical Enough for the Cheapest Car Efficient Enough for the Most Critical Car Elegant Enough for the Costliest Car

Economical, because the VASCO is a genuine \$50 shield selling for \$35.

Efficient, because the VASCO works on friction discs, without springs, screws or nuts; can be slanted at any angle, with one band, without stopping your car; clears any steering wheel easily; provides a "gap," protecting you in bad weather and at the same time giving you a clear view ahead.

Elegant, because the VASCO has solid brass tubing, finest French plate glass, and de luxe finish throughout.

"The Shield You've Been Wishing and Waiting For"

### "VASCO" BUMPER

This Bumper actually bumps. It affords full protection to the radiator, lamps and front of any car. Handsome solid brass finish, extra long and strong springs. A \$25 bumper for \$15.

#### "Vasco" Grindine Compound

Does away with the old, expensive, injurious method of grinding valves with oil and emery. Put up in cartons containing two tubes, one coarse, one fine; and will grind valves faster, smoother and better than anything else. Small size, 25 cents. Large size, 75

cents, containing five times the amount.

Write for the "VASCO" Catalog to-day and get acquainted with the "VASCO" quality products.

CTOR AUTO SUPPLY MFG. CO., 44 WEST 43D ST., NEW YORK

See the "VASCO" Exhibits at the Palace and Garden Shows, New York City

# How Much Lamp Value Do You Get For Every Dollar You Spend?



Solar Omega Headlight

Model 1076—Price, \$10.00 Model 1077—Price, \$11.25 Model 1078—Price, \$15.00 Model 1079—Price, \$18.75 That's a question worthy of your careful consideration.

The price you pay for a lamp represents four things: The material, the workmanship, the overhead expense (including selling expense) and the profit.

The smaller the last two items can be made, the

better the lamp you get.

The overhead expense is practically the same in a plant making 15,000 lamps a year as in one making 250,000.

The profit must be larger in the small plant, in order to give the maker a living.

That is why

### SOLAR LAMPS

made in the largest factory in the country, represent the best lamp value you can buy.

We make every kind of lamp used on the automobile, motorcycle or bicycle. Our overhead expense is so widely distributed that you get twice as much workmanship and material value, dollar for-dollar, as in the ordinary lamp.

That is why Solar Lamps, though they cost a little more than common lamps, are part of the equipment of 80 per cent, of the high-grade cars made in America.

Every motor-car buyer can have them, if he will simply tell the manufacturer plainly that it must be Solar Lamps or none.

Don't let the manufacturer give you lamps that you'll have to throw away later and replace with Solars. Get them at the start and have assurance of absolute safety at night.

Something special coming for the New York Show. Watch for it.

### **Badger Brass Manufacturing Company**

KENOSHA, WIS.

NEW YORK CITY



Solar Lens Mirror Search

Model 956A-Each, \$7.50

Model 957A-Each, \$10.00 Model 958A-Each, \$13.75

Model 859A-Each, \$17.50



Four styles - Bolted on with Removable Rim, Clincher, Quick Detachable Clincher, Dunlop.

### To Fit Any Rim

All truly representative of FISK QUALITY— the highest grade automobile tires in the world.

All will be exhibited in the Fisk booths at the Grand Central Palace and Madison Square Garden Shows, New York City.

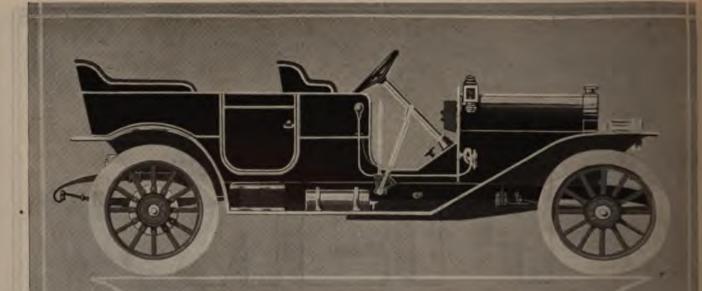
You are cordially invited to visit the FISK Exhibits and inspect the various styles.

### THE FISK RUBBER CO.

Chicopee Falls,

Mass.

Branches in Seventeen Cities



### HERE IS A SPECIAL CAR FOR A FEW SELECT BUYERS

Prices, for either Standard Touring or Torpedo Bodies

\$2500

About three hundred prospective purchasers who have it in mind to pay from four to five thousand dollars can "get in" on this made-to-order Springfield for 1910.

For the past three years a limited number of these cars (about 100 each year) have been made for special buyers, who have desired certain features in their cars not to be found in any cars on the market, regardless of price.

Hence the Springfield has come to be known as the "made-to-order" car.

Until this year no attempt has been made to manufacture more than the few cars, which were easily sold by private sale to the class of buyers to whom a car of this character appeals.

For this reason practically no advertising has ever appeared concerning the Springfield. This year, however, we have increased our facilities, and hope to be able to supply in the neighborhood of three hundred cars.

The fact that we manufacture practically every part that enters into the Springfield makes it impossible (even if we were so inclined) to make them in the quantities possible with an assembled car.

No apology is made for the low price we have placed upon the car. This price enables us to supply the best material of every kind it is possible to buy, and in addition gives us a fair profit.

We are willing to let the specifications speak for the quality of material used and the general character of the car.

The automobile dealer, familiar with all makes, will immediately recognize in these specifications and the accompanying illustrations an automobile of the strict de luxe type—a car of the character that will always have a ready sale among those who are in a position to

### SPRINGFIELD MOTOR CAR CO.

307 MONROE STREET

SPRINGFIELD, ILL.

# The Goodrich Demountable Rim

### NOTICE TO THE TRADE

Your attention is called to the fact that all rights granted The B. F. Goodrich Company in U. S. Patents 910,869, 926, 296, 894,290. 894,291 and 894,292, covering new and distinctive features of Demountable Rim construction will be fully protected by due legal process against any and all infringements.

We will be glad to demonstrate at our Exhibit in the Grand Central Palace and Madison Square Garden Shows the mechanical advantages of the Goodrich Demountable Rim for ready inflated tires.

### THE B. F. GOODRICH COMPANY, AKRON, O H 10

BRANCHES IN ALL LARGE CITIES





Palmer-Singer Six-Sixty, 6 cylinders, 60 H. P., Sixty-five miles an hour

The 1910 models of the Palmer-Singer line are two years in advance of the new models of other and higher-priced makes and here are the REASONS WHY

#### Features of Construction Common to all Palmer-Singer Models

The best features of the best 1910 cars were found in the 1908 Palmer-Singer models. The five best other makes have between them for 1910 ALL the features which were leading constructional Palmer-Singer points two years ago—but no one make has them all. Still each make very properly exploits these features as the utmost yet achieved in motor car construction and value. Bear in mind that while adopted for the first time in their 1910 models by other makes, these features have been for two years integral points of Palmer-Singer construction, and have been thoroughly tested out for two years in the hands of private owners—have stood exactly the use you would give them. They have been adopted and refined for two years, brought to the point of perfection not only in themselves, but with relation to every other part of the car. Today the harmonious whole is, in design and value, two years ahead of the other leading makes who are adopting these features or a part of them for the first time. Lack of space prevents the enumeration of more than two or three,

#### How Our Cars Are Made

We are now building thousands of cars every year. We are building a few perfect cars for the discriminating men who want perfect cars. The names of our owners are the names of the nation's foremost men. There is prestige in owning a Palmer-Singer. Every individual item of the car's makeup the best that anyone in the world can design, produce or build. Every workman is the best that can be secured for the purpose. If we were building a car to your individual order with the price limit removed, we could do no more in the way of perfect finish, perfect adjustment of each mechanical part. Each car is a masterpiece.

#### The Result

That is why Palmer-Singer cars wear so remarkably welland consistently, one and all give a perfect service, every every week, every season, every year. That is why Palmer-Singer owners say that even the big Palmer-Singer Six-Sixties cost less for repairs or replacements than any other cars they have ever owned. Men have driven our cars for two years without the replacement of a single part, and without a repair beyond the ability of a good chauffeur or an expert owner. Men have given our big Sixes a hard year's use over bad roads in this country and then toured Europe without a spare part with them, having never a hint of trouble except for tire punctures. Not a part needed adjustment, not a spark plug needed replacing, not a skip of the motor, not a knock in any moving

### See the Palmer-Singer Line at Madison Square Garden

PALMER & Singer Mfg. Co. 1620-22-24 Broadway, New York

See

the

FOX

at

Shor





# Prevent skidding absolutely and WON'T cut or hurt your tires—this we guarantee

The Fox Tire Chain prevents skidding absolutely It is the only chain which does. We stand behind this statement fully—it will keep your car from skidding. It will enable you to use your car on days when you would not dare take it out otherwise.

The Fox CAN'T cut your tires. In the Fox, no edge, no cutting surface of any kind comes against the tire. Nothing except a broad, flat, perfectly smooth metal surface, without edges, touches the tire. The broad flat links fit the shoe as harmlessly and as closely as a piece of tire tape. If you should swing a heavy sledge hammer against the links of the Fox Cross Chain, not once, but many times, you could not make it cut into the tires. If you should do this with other chains, you would quickly drive the links into the rubber and cut a great hole perhaps with the very first blow.

### TO THE TRADE

Would you like to have us guarantee to you the sale of 1-2 dozen sets of Fox chains?

Would you like to have us SHARE with you a profit we already have?

Then cut out \*\*\*\*\*\*\* > this coupon and mail to us.

(Horseless Age)

FOX METALLIC TIRE BELT CO. Broadway—at 68th St., New York City

Gentlemen-

Kindly send me your New Territory off

Name

Address



17-19 MCKIBBEN STREET BROOKLYN, N. Y.

> New York Salesrooms: Broadway and 68th Street.

#### THE LARGEST AUTOMOBILE SUPPLY HOUSE IN AMERICA



### Your Profit, Mr. Dealer

depends upon your sales. You must sell goods that are in demand and move rapidly, and give you a good profit. We would like to have you investigate

#### The Celebrated Brampton Chain

They are rapid sellers and bring many duplicate orders. Every customer A SATISFIED CUSTOMER and a daily advertiser for YOU AND THE BRAMPTON CHAIN. They are the strongest chain on the

market. Made of self-hardening steel. We have in stock all sizes to fit American and foreign cars.

THE PRICE is the same as you pay for any other chain; in fact all automobile chains now on the market are same price to manufacturers, jobbers, dealers and users, and our prices are the same as quoted by chain manufacturers.

PRICE THE SAME. QUALITY? INVESTIGATE, Get the best at the same price. Agents wanted in unoccupied territory.

For Sale by Jobbers and Dealers and All Our Branch Stores

### Pan-American Automobile Body Polish



Pan-American Polish was awarded the Bronze Medal ("the only one awarded") at the Louisiana Purchase Exposition at St. Louis, 1904. This polish has been carefully prepared for the Automobile trade. It is also applicable to the carriage trade, or can be used on any varnished furniture or woodwork of any kind. It will remove stains, cover scratches; leaves the automobile with its original new lustre without being sticky or greasy.

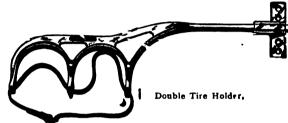
It can be used on the leather seats or tops with the very best results. Can be used on any color or kind of varnish from the clearest white to the darkest black. Furnished in eight-ounce bottles.

#### FOR SALM BY ALL AUTOMOBILE DEALERS

Price, 60 cents per 8-oz. bottle

Price, \$3.00 per gallon

Special Prices quoted Manufacturers, Jobbers and Dealers



# THE DIAMOND "M" TIRE HOLDERS

This illustration shows our new Tire Bracket, made from the finest quality of yellow brass composition. These are the best made and the finest finished set of tire brackets on the market, and the prices are lower than quoted by anyone else on similar tire brackets.

#### MILLER'S DIAMOND "M" VULCANIZING SUBSTITUTE

Will cement leather to rubber. Willput patches on your inner tubes that will not pull off.

off.
TOURIST KIT.
For tourists we furnish a kit packed in a wooden box with sliding top, % pint each Cement and Acid Cure, a piece of emery cloth and brushes for applying cement and acid.
Price each, 90c.

Price each, 90c.
FOR SHOP USE.
—We furnish this
substitute in boxes
containing one pint
each or one quart
each, cement and
acid solution.
Price, \$1,25 and
\$2.00.



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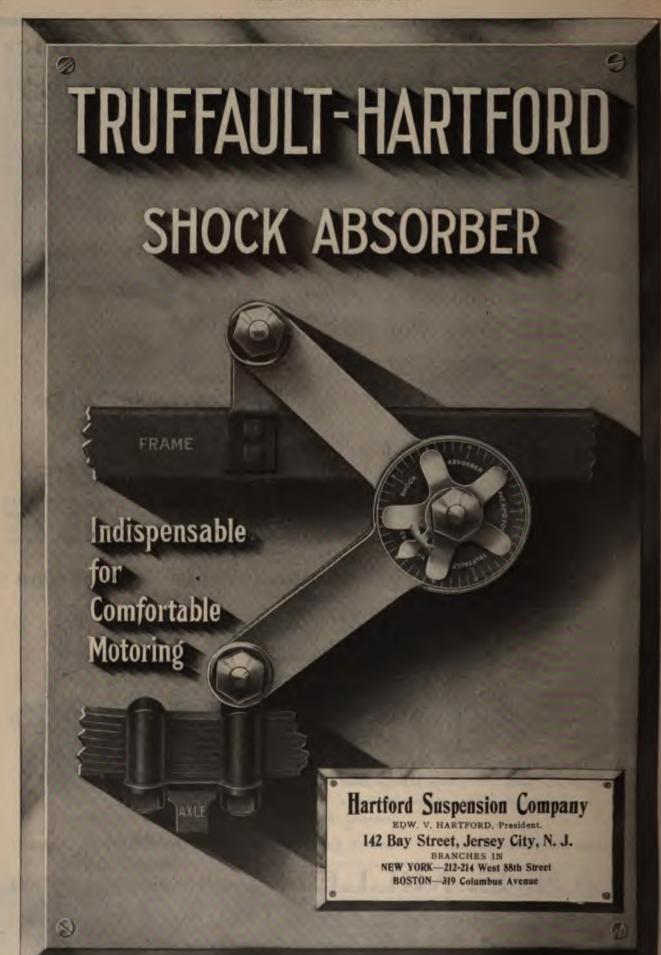
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### REASONS WHY

Your Car Should be Equipped

The Truffault-Hartford Insures

Easy, Comfortable Riding

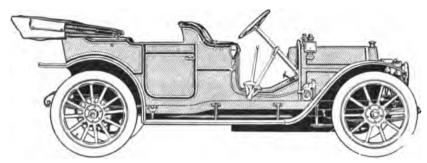
Immunity from Spring Breakages

Minimum Tire Expense

Perfect Traction-No Waste Power

Reduced Cost of Up-keep

See Us At the Shows



Chalmers-Detroit "30" Touring Car and Roadster, \$1,500; Pony Tonneau, \$1,600; Inside Drive Coupe, \$2,100; Limousine, \$2,750.

November 25.

From Motor Age

American makers. A compilation of re-sults would seem to give the honors to the Chalmers, which started tweaty-two cars ed second three times and This left twelve cars un-The Buick record shows twenty

(This refers to road racing)

### **Cars That Have**

Made Good

From Motor Age OW THE CARS WERE PLACED

November 25.

(This refere to road rec

Automobile buyers might be pardoned if they felt a little bit bewildered right now. There are so many new cars being announced and so many radical claims being made for them that buyers are apt to be a little bit "up in the air."

The average automobile buyer is very largely at the mercy of the manufacturer, because he doesn't know nearly as much

about what he is trying to buy as the other man does about

what he is trying to sell.

The average buyer—you may as well admit it—has not had the technical training, nor the experience, that would make him capable of judging whether a new model really was a good one.

He must depend upon someone else. But who? The dealer? He may be prejudiced. The Maker? He may be prejudiced. The record of the car? Yes, by all means, if the car has a record. The public? Yes, again, if the public has bought a car in quantities and tried it.

While the horse may be passing, yet Horse Sense is still as bread and water to us. Here is a bit of it that will appeal especially to any who are bewildered by the many CLAIMS

now being made:

You can't make a mistake if you buy a car of established reputation—a car that has stamped upon it a big, successful, reliable name—a car with a record—a car that the people

You MIGHT make a mistake buying some other kind of a car. A new car may be a good car, but no one knows that it is until it has been thoroughly tried out.

People of the United States have spent millions for motor

reopie of the Onlied States have spent millions for motor cars. Those people really have made purchasing an easy matter for you, when you stop to think of it. Why not profit by their experience?

You take no risk when you buy a Chalmers-Detroit car. Our cars have made good for years. Thousands of owners have proved them for you. Think what they have done to

prove themselves.

In two seasons of motor contests Chalmers-Detroit stock cars have won 89 firsts, 32 seconds and 21 thirds. Motor

Age records give Chalmers-Detroits title of the champion

cars of the year.
You do not want a racing car. Neither do we. We have never built one.

We have not gone into races merely for the fun of it. It is simply a cold dollars and cents proposition. We have gone into contests because we believed that was the best

way to prove our cars.

A man might say he was the best Marathon runner in the world. He might show you that he had a deep chest, and strong legs, and that his wind was good, and give you other reasons for thinking he was a good Marathon runner, but unless he actually went into competition against other Marathon runners and defeated them you would have a right to doubt his claim of being the best.

The same is true of cars. It is easy to claim that a certain car is the best car made, or that it is the best car at the price. It is easy to advance plausible arguments to support such claims, but the one unassailable proof is that of perform-

We spent last year a good many thousands of dollars in automobile contests. One-third of this amount we charged to advertising expense. Two-thirds we charged to Engineering Expense—because this is the best experimental work we know.

We are determined to build the best cars in the world at the price, and so long as we think contests help us do that we shall remain in contest work.

We have never claimed to make the best cars in the worldbut the best cars in the world AT THE PRICE.

True, there are many people who believe Chalmers-Detroit cars are the best cars made, regardless of price—those people are owners of Chalmers-Detroit cars.

And we know ourselves, that Chalmers-Detroit cars are better than a great many that sell for fancy prices.

But the only claim we really want, or need, to establish is that our cars are the best in the world at the prices asked.

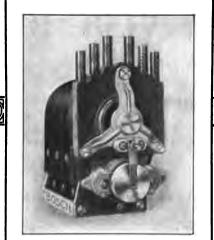


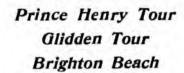
### **Chalmers-Detroit Motor Company**

Detroit, Michigan

(Members A. L. A. M. Licensed under Selden Patent.)







Vanderbilt Cup Lowell Atlanta Meet

### These High Class 1910 Cars will be Equipped with **BOSCH MAGNETOS**

Acme Alco Allen-Kingston American American Mors American Napier American Simplex Apperson Auburn Autocar

Babcock Badger Belden Benz Bergdoll Berkshire

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S. P. O. Selden Sharp-Arrow

Simplex Speedwell Stearns Stevens-Duryea Stoddard-Dayton

Studebaker Sultan Sunset Swift

Thomas Tourist

Walter Warren-Detroit Wayne Welch White Wilcox Winton

More than a score of manufacturers of cars in this list adopted BOSCH MAGNETOS during four months in the Summer season. This remarkable growth in so short a time is a convincing argument as to the excellence of the BOSCH MAGNETOS and their reputation among expert car makers.

An illustrated book picturing noteworthy automobile events of 1909 and the victories of Bosch Equipped Cars will be sent on request.

See our exhibits at the International and National New York Shows.

### **BOSCH MAGNETO COMPANY**

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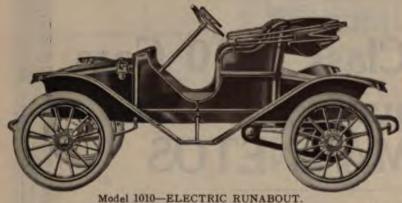
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### Your Visit to the

### Grand Central Palace Show

WILL BE COMPLETE WHEN YOU SEE

AND



THE

"THE CAR SUPREME"

THE



"THE CAR COMPLETE

Model 62A-LIMOUSINE.

For the Dealer:

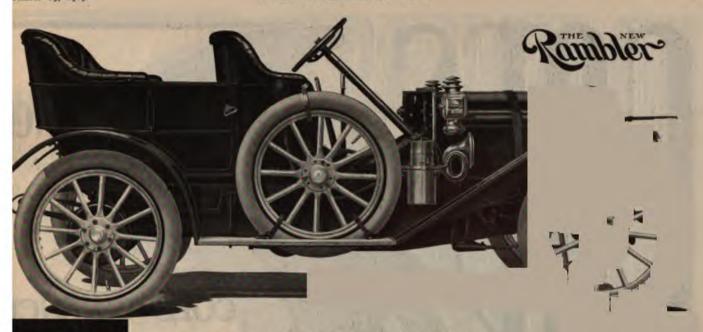
The Cars That Sell

The Cars That Serve

The Triumph of Forty Years' Honest Effort WRITE TODAY FOR CATALOG AND TERMS

The Columbus Buggy Co., columbus,

In writing to advertisers please mention THE HORSELESS AGE.



Rambler Fifty-three, 34 H. P., \$1,800, with Magneto, Lamps and Tools.

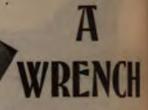
THE new \$1,800 Rambler is identical in quality and materials with the higher-priced models. Built for the man who wants a car of somewhat smaller size, yet of exceptional but not extreme power; a car easier to get about with and easier to drive. With thirty-four horsepower engine, Rambler offset crank-shaft, straight-line drive, 36-inch wheels, the advantages of clearance, spare wheel, engine accessibility, aluminum front floor and magneto included, this car is better in quality and efficiency than many cars selling at a higher price.

### Thomas B. Jeffery & Company

Main Office and Factory, Kenosha, Wis.

Branches: Chicago, Milwaukee, Boston, Cleveland, San Francisco. Representatives in all leading cities.

#### THE CAR OF STEADY SERVICE



That will move the most stubborn nut that's stuck, without injuring the corners of the nut or stripping the thread of the bolt, is the

### COES WRENCH

The bar of this wrench is the outcome of 70 years of experiment and invention.

It is pressed (not drop forged) and cold swaged, then thoroughly hardened.

The handle shell is internally supported.

The steel ball for screw thrust is a first quality, high grade hardened one.

The screw is not cut from a bar of low grade steel, but is carefully forged and hardened.

Quality is maintained by careful selection, expert assembly, and 16 inflexible inspections.

The whole wrench is built for wear, not selling looks, giving you 30 per cent. greater strength for 5 per cent. more cost.

Write for Wrench Book.

### COES WRENCH CO.

ESTABLISHED 1841 IN

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**AGENTS** 

J. C. McCARTY & CO., JOHN H. GRAHAM & CO.,

21 Murray Street, New York City
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Without a
C o e s
Wrench in
it would be
hard to find.
If the purchasing agent thinks
he can save money for his
firm buying a wrench for
5 per cent. less cost getting
30 per cent. less strength.

This is not done by the workman who has his own tools; he has a

### COES WRENCH

Cheerfully paying 5 per cent. more cost, knowing he will get 30 per cent. extra life, strength and service.

Quality first. Every part carefully selected, thoroughly hardened and inspected 16 times.

Made simple and plain, but having all the strength necessary.

Every unit has a reason for being in this wrench, having the maker's O. K. for form, strength and quality. That is the reason it can be relied upon in emergencies.

No nut will refuse to move when a Coes is applied to it. Besides, it will not injure the nut, casting or thread of the bolt.

LET US SEND YOU OUR WRENCH BOOK.

### COES WRENCH CO.

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# RBFs ALWAYS WIN



(Translation)

### COMPETITIVE TRIALS OF COMMERCIAL VEHICLES

## RBF BEARINGS

The general use of these excellent bearings demonstrates their superiority.

These trials demonstrate the incontestable superiority of RBF bearings. A victory bearings of this brand. The first honors in all five classes taken by trucks equipped entirely w RBF bearings. The majority of the other vehicles were also equipped with RBFs. This clear indicates that RBF bearings are suitable for heavy trucks as well as for high-speed pleas vehicles. The Brillie autobus of Paris, which is mounted on RBFs, gives an excellent idea of the durability.

# The Winners:

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With	C. A. SHALER CO., Waupun, Wis., Box O.  Send free copy of Garage Hand-book with description of and best discounts on SHALER BLECTRIC VULCANIZERS.  We have  Alternating Current  No Current  No Current  Check your current.
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	J/L
TYPE	TYPE F OR "GANG"

Tires are higher than ever before. That means that fewer new ones will be bought and that

the old ones will be repaired again and again.

Are you prepared to get your share of this most lucrative business? Are you ready to take care of your customers' tires? If not, someone else is going to get the work and the profits will go into his pocket, not yours.

There is more profit in vulcanizing tires than in any other part of the garage business. You get 50c. for the very smallest job. It costs you less than 3c. The profits on larger jobs are proportional. Can you make money any faster?

We make three types of Shaler Electric Vulcanizers from which you can select an outfit that

will just exactly fill the requirements of your garage.

1. Type B. For inner tube work and for vulcanizing the treads of casings while still on the wheel. The heat is evenly conducted to all parts of the repair, so that there is no danger of

over-curing in one place and under-curing in another.

Type B has a patent handle so that it can be easily moved from one job to another while still hot, and as there is no flame it can be used either in or out-doors, and in any position and on any part of the tire. It has a rheostat heat control, so that there is no danger of the repair overheating or the heat gauge breaking. Cost of operation, one-half cent per hour.

Type B, for direct or alternating current, \$20.00 to \$25.00.

2. Type C will mend any blow-out or tear that it is practicable to mend in any size casing by a much cheaper and simpler method than with the old steam vulcanizer, as the new fabric is applied from the inside of the tire instead of the out, thus saving cutting away a lot of good rubber and requiring only about half as much fabric. This is possible because Type C fits inside of the tire, bringing the heat directly against the new fabric, and because of the enormous pressure that we are able to apply with this vulcanizer to weld the new and old fabric together. You do away with the two weak joints that always occur on a job done by a steam sectional vulcanizer, where the fabric was put on from the outside and which are caused by the necessary lapping of the canvas.

Type C, for alternating current, \$20.00; for direct current, \$25.00.

3. Type E or "Gang," 24 inches long, will vulcanize six tubes at a time or will mend a six inch slit at one setting. It is furnished with four patent clamps and four blocks for four sizes of repairs.

Type E, for alternating current \$25.00; for direct current, \$30.00.

Repairers and Garages, tear our coupon at top of page and mail to us now, together with your letter-head.

# We Make the Most Simple Vulcanizer for Auto-Owners

Vol. 24, No. 26.

# Mishing You a



Grip Anti-Skid Tread
Regular Tread
Bailey Tread
The best casings—the best tubes

The new Diamond will be demonstrated at At the Madison Square

THE DIAMOND AKRON.

# Happy Hew Year

# Made to Fit All Rims

Quick Detachable Clincher
Regular Clincher
Fisk
Mechanical (Dunlop Type)

Demountable Rim the Palace Show, Space No. 1D. Garden Show, Space No. 101.

RUBBER CO. OHIO



# Fundamentally Right For Six Years

The motor in the 1910 Models is exactly the same in principle and all essential features as the motor in the first car built by this company, thus proving that its original designer, A. P. Broomell, started on correct mechanical lines. The record of the Pullman in private service and public tests has induced a close adherence to these "First Principles,"—throughout six years,—though refinements have been made year by year, reaching their climax of perfection in the 1910 Models, which were designed by Guillard, formerly of the Clement-Bayard, Mercedes and the Benz factories of Europe.

The body design and appointments, the control, the braking system, the exclusive oiling system, the semi-elliptic springs, the roomy tonneau, and other vital features all combine to make the Pullman a car of exceptional beauty, easy riding qualities and lasting service.

# "Not Only the Best at the Price But the Best at Any Price"

Models and Prices:

Model "K"-35 H. P. Touring Car or Roadster, \$2,000 | Model "M"-40 H. P. 7-Passenger Touring Car. \$3,500 | Model "4-40"-40 H. P. Roadster, . . . 3,000 | Model "O"-28 H. P. Toy Tonneau and Roadster, I,650

F. o. b. Factory, York, Pa.

Write for announcement of 1910 Models.

# York Motor Car Company, Inc., Dept. L. York, Pa. 238 N. George Street

See Exhibit at New York Show, Grand Central Palace, December 31 to January 7.



# THE MASTER CAR

will be exhibited at the Grand Central Palace Show in a way befitting its "master" position in the world of automobile design and manufacture. The aristocratic and serviceable Fiat cars for town use will be worthy of especial attention.



15 H, P. FIAT COUPE-LANDAULET. \$3,500 (Completely equipped)



15 H. P. FIAT COUPE-BROUGHAM. \$3,500 (Completely equipped)

### CHASSIS PRICES

15 Horse-power Shaft Drive, 4-Cyl. \$2,750

45 Horse-power Shaft Drive, 4-Cyl. \$5,250 25 Horse-power Shaft Drive, 4-Cyl. \$4,500

45 Horse-power Enclosed Chain Drive, 6-Cyl. 86,000

45 Horse-power Enclosed Chain Drive, 4-Cyl. \$5,000

90 Horse-power Chain Drive, 4-Cyl. \$7,500

BODY PRICES ON APPLICATION.

FIAT AUTOMOBILE CO., 1786 Broadway, New York City

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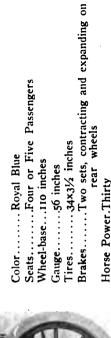
# The 1910 Car

In no other car on the 1910 market can you get so much automobile for your money as in the "Everitt 30"



# STANDARD EQUIPMENT

Five Lamps, Generator, Splitdorf Magneto and Full Set of Tools.



Cylinders....Four—en bloc
Bore......4 inches
Stroke.....434 inches

Cooling..... Water
Radiator.....Vertical tube, enameled pressed steel shell

gnition.....Jump spark, dry battery and magneto Clutch...... Cone Drive......Shafft Fransmission.Selective sliding gear on rear axle

speeds.....Three forward, one reverse

See Our Exhibit Grand Central Palace Show, New York Opens New Year's Eve

The newest factory and the oldest builders tell the story in single phrase.

Experience in building is the only left-over factor that has gone into the construction of this car—everything else brand new!

You know the tremendous success of the last car brought out by Byron F. Everitt, William Kelly and William E. Metzger.
This new "Everitt 30," owing to the reasons below given, will surpass in every way all past cars or any new car that can be brought out during 1910.

In writing to advertisers please mention THE HORSELESS AGE.

recognized two things of prime impor-Car Company The Metzger Motor

demand of 1910 wil be for a high-class car at a low cost. that the First,

condition of things the public must be turer could dictate to the public, owing is the car you get-take it or leave it,". They saw that in the new Second, that the time had about passed when the automobile manufacthe excess of demand, and say represented.

So, they called in twelve of the largest automobile sales agents and distributors in this country-men who have sold annually for the last ten years an average of eight million dollars' worth of automobiles.

These men were invited to come into the enterprise because their knowledge was believed necessary to the making of ideal moderate priced car for 1910. of conditions, their knowledge of cars, their knowledge of men and their capital

The "Everitt 30" is the result of the combined focused knowledge and perience of all these men.

Simplicity is its keynote.

Right side of engine, showing extreme simplicity in construction.

New 1571 and Main 1255. Indiana and Western Kentucky. Co., 215 North Delaware St. 'Phone, West Onondaga St. 'Phone, Bell 290, Central and Western New York.

NDIANAPOLIS-Motor Car

mechanism has been simplified at Things which not be eliminated to the clear working advantage of the car have been contains 150 fewer parts than its closest consolidated. The "Everitt 30" motor every possible point.

of combining two or more parts into competitor! Think of it-150 less parts. the crank case, the four (4) cylinders ment of simplification, of consolidation, One casting for the upper half of And this eleone casting is consistently carried out and the water jacket! all through the car.

ಡ for the manufacturer can and does tion. The "Everitt 30" is so simple cheapening in the quality of materials much lower original cost without any put the same materials into this machine that you find in \$5,000 machines. It means simplicity and ease of operathat any man can run it; that the hiring of a chauffeur is not a matter of neces-This element of simplicity means

To save a chauffeur's wages means, in sity, as with a car of complex mechanmany cases, the difference between havism, but a matter of convenience only. ing and not having a car.

pounds-or about 300 pounds less than

its nearest competitor.

it to quite the perfection of the "Everitt 30"—which has a 51/2 inch drop, as machines have it, but none has carried against a 31/2 inch for any other comimportanț feature. petitive car.

This puts the centre of gravity close

On the other hand, the man who ing mechanism are not as near the ground as are those of our competitors. In a word, this car is made for runs on country roads wants a every kind of driving. clearance.

"Everitt 30" weighs less than Take the matter of weight.

do stand back of it. This warrants

It costs a lot less for tires. It costs It is not a cheap car elaborated. It neering, by skillful corner cutting, by special advantage of the newest factory and the oldest builders, down to the Absolutely the best is to be found in every part of the "Everitt 30." It is not an assembled machine. It is built And this has been done without the In no other car on the 1910 market can you get so much automobile for is a costly car focused by adroit engisacrifice of a single point in quality. in its own new factory by specially designed new machinery, and under the watchful eyes of those who must and your money as in the "Everitt 30." low cost of \$1,350. • a lot less for fuel. free The double drop frame is another Some expensive down to the ground—so that the car will not skid or overturn. "Everitt 30" axles and steer-

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the standardization of parts, and enables you, at any distant time, to place instantly any part in your without special The 2,200 B68 Woodward Ave. 'Phone, Grand KANSAS CITY-Kilburn Motor Car

Rear axle assembly, showing transmission incorporated on rear axle, the two brakes on the rear wheel operating internally expanding and externally contracting on brake drum. In the upper right hand is shown the spring suspension.

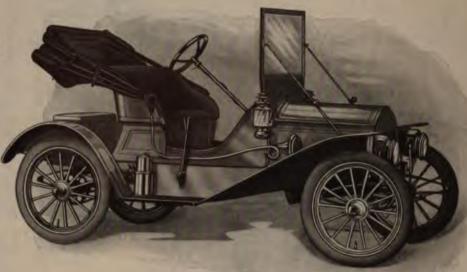
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# All Those in Favor of Low Running Cost

# SAY I!

THE LITTLE GAR



WITH A BIG HEART

Double Opposed Motor with Offset Cylinders. Bosch Magneto—Schebler Carbureter. Goodyear Clincher Tires—Quick Detachable Wheels, and Full Equipment, all for :: :: ::

\$378 or \$475

ACCORDING TO THE WAY YOU ELECT TO BUY IT

# THE PRICE WINNER

Not only in first cost but also in upkeep. More power and speed at half the cost than others selling at double the price. TESTIMONIALS? PLENTY! Here's what one owner has to say:

"I have been using one of your Metz Plan Cars which I assembled myself in my business for the last three months. It has taken the place of two driving horses, and I am covering more ground than ever before and at considerably less expense than it costs to keep one horse. I have no trouble that I could not remedy myself in a few minutes and have given the car some pretty rough use, and I must say that it is fast enough and an excellent hill climber."

NEW YORK PALACE SHOW Stand B .: Second Balcony

# METZ COMPANY Book P Waltham = = Mass



The only car of established reputation selling at a moderate price

DON'T BUY ANY CAR AT ANY PRICE UNTIL YOU SEE IT

HAYNES AUTOMOBILE CO. Station F, Kokomo, Ind.

Licensed under Selden Patent

## THE CAR WITH A FAMOUS ENGINE

NY automobile manufacturer with the proper amount of money can buy bodies as good as are used by any of his competitors. He also can buy as good axles, or magnetos, or carburetors, or transmissions, or wheels, or tires.

The market on these items is wide open to any and all manufacturers.

The Pierce Motor Car Company are not unlike 99 per cent. of other car manufacturers in the

The Pierce Motor Car Company are not unlike 39 per cents.

We part company with practically all other manufacturers when it comes to the most essential part of an automobile—the engine.

The PIERCE-RACINE car is not propelled by a stock engine.

When you buy a PIERCE-RACINE you get an engine specially designed by Mr. A. J. Pierce, who has for a quarter of a century enjoyed an international reputation as a builder of high-efficiency engines.

The unusual flexibility, quietness of power of a Pierce engine is the feature that hits the PIERCE-PACINE entirely out of the class of other cars selling at anywhere near its price.

RACINE entirely out of the class of other cars selling at anywhere near its price.

If you were to pay \$4,000 for a car you could not get a more satisfactory motor or an easier running car.

This PIERCE-RACINE at \$1,750 offers the prospective car buyer a value in the most essential feature of his car that is only duplicated by a few manufacturers of high-price American or Foreign cars.

In addition to its superb motor, it has an equipment throughout that is of a thoroughly substantial character.

The hole wheat expires wheletering and accessories—all are of a quality rarely found on a medium-

The body, wheels, springs, upholstering and accessories-all are of a quality rarely found on a mediumprice car.

### NOTE THESE SPECIFICATIONS.

Body: Five Passenger Touring, Baby Tonneau or Roadster. Wheel Base: 112 inches.
Tires: 34x4 inch, quick detachable or clincher.
Horse power: 30.
Motor: Special Pierce design; 4¼ inch bore, 5 inch stroke.
Cylinder: Four, cast in pairs.
Valve Arrangement: Offset on opposite side.
Brakes: Two sets on rear hub, drums 14 inches.
Wheels: 1½ inch spokes, artillery type.

Axles: Front, I-beam; rear, roller bearing.
Springs: Semi-elliptic front and rear with Temme shock absorbers.
Cooling: Water, gear driven, positive pump; high grade radiator.
Lubrication: Splash-geared pump; constant level.
Carburetor: Stromberg.
Gasoline Capacity: 18 gallons.
Ignition: Jump spark.
Current Supply: Magneto and dry cells battery; Remy dual system.

system.

Clutch: Multiple disc pattern, 39 plates.

Clutch: Multiple disc pattern, speeds forward and one re-

Drive: Shaft and bevels, 2 universal joints.

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Finish: Brewster Green, hair line cream stripe with alternating cream wheels and gears, if so desired.

Speed: 8 to 50 miles on high gear.

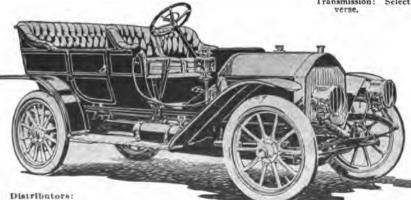
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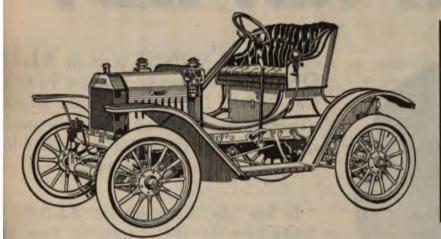
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THE FARMER, who looks at the Brush as an investment, not a luxury.

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A set consists of five rims. Four of these slide on over steel Felloe Bands, which are applied to the wheels and locked to the wheels as stated above. The fifth contains a spare tire and inner tube already inflated and ready to ride upon.

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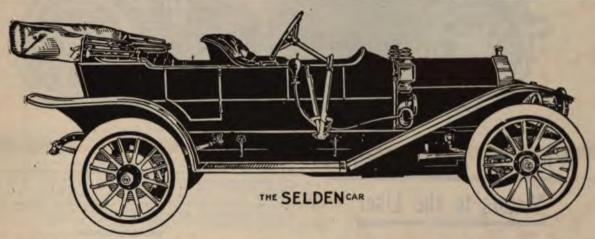
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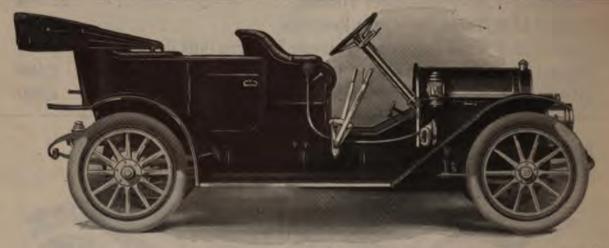
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One pedal, clutch and brake.
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SE—110 inches.

WHEEL BASE—110 inches. EQUIPMENT—Splitdorf Dual Magneto, Square side light and electric. Tail light, combination oil and electric. 6 is equipped with Silver Parabolic reflectors and powerful Tun ampere hour lighting battery, specially suited for purpose, pump and jack. Diamond tires, Q. D. 34x3½. WEIGHT—About 2,000 pounds empty.

# ABBOTT MOTOR COMPANY





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of American automobile designers.

Mr. John B. Phillips, on whom rests the task of building the Abbott-Detroit, and superintending its production in the large quantities that our advance or-ders already forecast, resigned his position of factory superintendent of the

Chalmers-Detroit Company to take up his present work.

With Mr. A. T. O'Connor, Sales Manager, formerly Assistant Sales Manager of the Packard Motor Car Company, and for a time in charge of their New York branch, will rest the important work of allotting territory to agents and distributing the cars. Mr. O'Connor's experience in the past has taught him the importance of efficient factory organization and rigid adherence to delivery dates.

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This superb organization-men who are acknowledged leaders in the automobile field; perfect factory organization working like clockwork, has a very important meaning to you, Mr. Dealer, and to your customers.

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Prestolite

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Style B, suitable for Cadillac 30, E. M. F., Buick Model F, 17, etc.

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Keeps Your Floors and Tires Clean

Made of 18 gauge steel; have round corners and pressed covers. Can be used for a step; are the strongest boxes on the market. Vibration, washing, weather and mud do not injure them.

Ask the manufacturers WHY they use HAYES boxes, then ask your jobbers FOR them



HAYES MFG. CO.

DETROIT

MICH.



Style "O-V"

# E.M.F. Company Wins

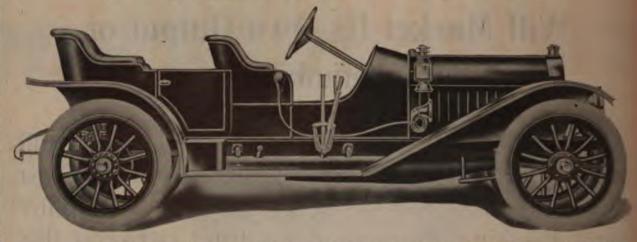
# Will Market Its Own Output of Automobiles

The United States Circuit Court, after a full hearing, refused injunction asked for in the interest of Studebaker's, to restrain the E. M. F. Company from annulling the selling contract between this Company and the Studebakers, and we are now free to contract for the sale of our product direct.

In appointing agents we shall give preference to those dealers who have previously handled the E. M. F. line. That's only fair, for this isn't the dealer's fight, and he should not be made to suffer. We have already signed up with several hundred dealers and for over 5,000 cars. Applications are pouring in upon us from all parts of the country. If you want the agency for E. M. F. "30" and Flanders "20" cars, come to Detroit quickly. Wire us before starting, and we will tell you if your territory is still open.

# E. M. F. COMPANY, DETROIT, MICH.

# Ten Reasons Why You Should Buy An ATLAS CAR



The average automobilist today demands Safety, Comfort, Silence, Style, Power, Fair Speed, Simplicity, Durability and Low Maintenance Charge—and usually a Fair Price. The Atlas combines all of these features to a greater extent than any other car.

I. SAFETY: Every part of the engine and car is made of the best quality material—thoroughly tried and tested under severest conditions. The running brake on the transmission—the emergency brake on the rear hub—construction endorsed by the best designers.

2. COMFORT: Experience has shown that the three-quarter elliptic spring now being generally adopted and first used in this country on the Atlas cars gives the easiest riding car, eliminating all side sway of the platform springs; the springs of the Atlas are extra long three-quarter elliptic, made from imported Krupp silico manganese steel, the best material known for this purpose, which, combined with the long 128" wheel base, gives a car which for comfort has no superior.

3. SILENCE: The absence of external moving parts makes the engine the quietest engine running.

4. STYLE: Atlas cars are classy in lines, are highly finished and handsomely upholstered in hand buffed leather, with every convenience and comfort.

5. POWER: The Atlas 60 H. P. engine is the highest powered engine put into a medium priced car; furthermore, this power is developed at an engine speed of twelve to thirteen hundred revolutions, giving an available power in the hands of the ordinary user for general work and hill climbing.

6. SPEED: The Atlas car has a variable speed from five to sixty miles on the direct drive high speed gear.

7. SIMPLICITY: The Atlas engine is the simplest engine built—two moving parts to each cylinder and a crank shaft.

8. DURABILITY: The Atlas engine will outwear any other automobile engine built—the crank shaft is hardened, ground and polished; the bearings and shaft are indestructible under ordinary conditions, and engine parts replacements are practically unknown.

9. LOW MAINTENANCE: The absence of replacement makes the maintenance cost the lowest.

10. PRICE: The price is several hundred dollars less than any other car of equal power and quality.

60 H.P. Toy Tonneau, \$2500; 60 H.P. Touring Car, \$2500; 20 H.P. Taxicab, \$2400

Atlas Motor Car Co., SPRINGFIELD - MASS. New York Branch, 1924 Broadway

In Gay Paree You always see Stewart Speedometers, oui-oui, oui-oui!

# HORRIBLE POETRY DES

But -

the finest speedometer ever made in any country

Displaces other makes everywhere

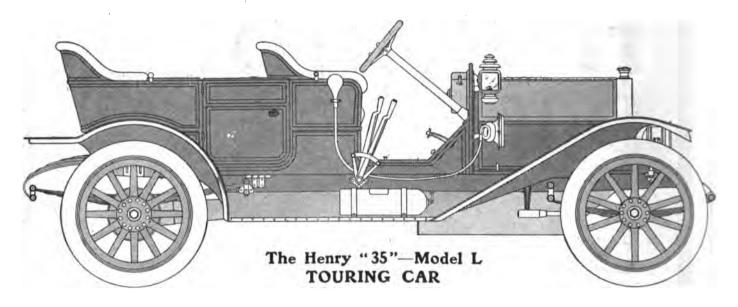




Stewart & Clark Manufacturing Company

1485 Diversey Boulevard, Chicago, U.S. A.

# The Car That Fits Present Day Demands



# Built to Sell on its Merits at \$1750

The day has come when the public is <u>demanding</u> automobiles of the highest type—of real, lasting merit—at a reasonable price.

Buyers of automobiles today are pretty well informed on car values.

They insist on getting their money's worth in automobiles—the same as in anything else.

With the growth of the industry, it has become more and more difficult to dispose of "near" cars to any but buyers who intentionally buy for one season only.

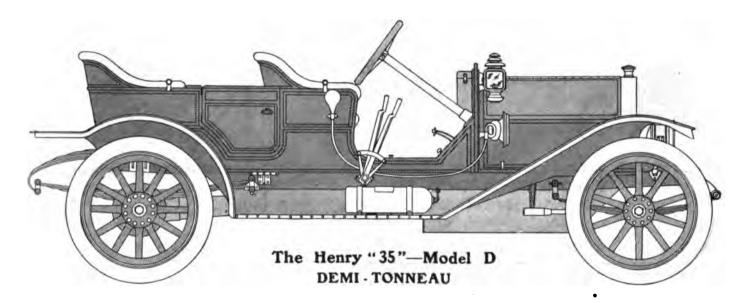
In the past, the automobile dealer has had a good many peculiar contrivances offered to him with the automobile label attached.

In the hurry to make enough cars to go around—and to get a "slice"—some manufacturers with more capital than experience have passed up to the dealer some most extraordinary specimens.

Fortunately for the dealer, there have been heretofore enough kinds of customers to more than take care of all kinds of cars.

## HENRY MOTOR CAR COMPANY

# Real, Lasting Merit At a Reasonable Price



# Built to Sell on its Merits at \$1750

The tendency toward cars of real merits at a reasonable price has been stronger every day, as hundreds of dealers well know.

First, because the generous distribution of automobile literature has educated the public to judge automobile values.

Second, because the buyers of one-year cars invariably buy into a better class on second purchase.

The Henry represents a serious attempt—and a successful one—to give the dealer a car he can sell to this class of informed buyers.

It is built to sell on its merits at a popular price.

The car was designed and is being built under the personal supervision of D. W. Henry, well known to dealers in every part of the country. Mr. Henry has been connected with the automobile industry from the beginning and

## Muskegon, Michigan

has made a careful study of the features that prove most attractive to buyers of moderate priced cars, and these features have been embodied in this Henry "85."

The car has a large motor, a long wheel base, a roomy tonneau, double drop frame, and extra long, resilient rear springs (49 inches) for easy riding.

It is carefully constructed throughout, and the accompanying illustrations plainly show the style is superb.

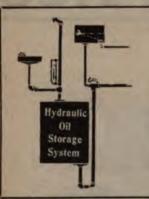
Dealers should investigate the opportunities for them in some choice open terrirories.

### DEALERS' COUPON

HENRY MOTOR CAR CO., Station B. Muskegon, Michigan.  Gentlemen: Send me information about open territory and description of the cars.
Name
Address

In writing to advertisers please mention THE Horseless Age.

# The Dependable Kind. Sole Importers NEW YORK TIMES BUILDING.



THE HYDRAULIC SYSTEM OF

# Gasolene Storage

Full Tank Top Feed

NO EVAPORATION THINK IT OVER.

FULL INFORMATION FROM

HYDRAULIC OIL STORAGE COMPANY

Broad Exchange Bldg. NEW YORK, or 606 Penobscot Bldg., DETROIT, MICH.

### VALENTINE & COMPANY

Manufacturers HIGH-GRADE VARNISHES and COLORS for MOTOR CARS Send for Color

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"The best by every test"

### VALVOLINE OIL COMPANY 11 Broadway, New York

BRANCHES: Philadelphia, Boston, Chicago, St. Louis, Cincinnati, San Francisco, Los Angeles,

THE "APLCO"



### Continental Motors Are Stan



CONTINENTAL MOTOR MFG. CO..

DIRECT FACTORY REPRESENTATI K. F. Peterson, 166 E. Lake St., Chir L. D. Bolton, 31) Hannant Bide., Detro

### See It at the Show

Don't leave the Garden Show without look-ing up the K-W Ignition Company's exhibit of the famous K-W Magnetos and Spark Coils, Our full line of Magnetos will be shown, in-cluding the

### NEW 1910 K-W HIGH TENSION MODELS

the very highest type of magnetos made today. K-W Magnetos are years ahead of all others, and both the High and Low Tension Magnetos will start the heaviest engine without bat-teries on the quarter turn of the crank.

Sold with an absolute unrestricted two years' warantee and a thirty day trial money back nederstanding.
Write for full information and do it now!

TheK-W Ignition Co., 32 PowerAve., Cleveland, O.

# Every Purchaser

of a motor car must, sooner or later, solve for himself the problems of the propulation of a car, safe storage and handling of gasoline, cold weather precantal putting up a car for the winter, grinding in valves, repair of punctures, etc.

Our new book, "Operation, Care and Repair of Automobiles," compiled by Albert L. Clough, will help you to solve these problems, and a lot more.

Price, \$1.00. By mail, postpaid, \$1.10, including all foreign countries in Postal than

The Horseless Age

9-11 Murray Street

New York



Sole Importers TIMES BUILDING. NEW YORK



# Special Show Numbers of the Horseless Age

The following are the dates of our Special Show Issues for the coming show season:

December 29—First Grand Central Palace Show Number

January 5—Second Grand Central Palace Show Number

January 12—First Madison Square Show Number

January 19—Second Madison Square Show Number

February 9—Chicago Show Number

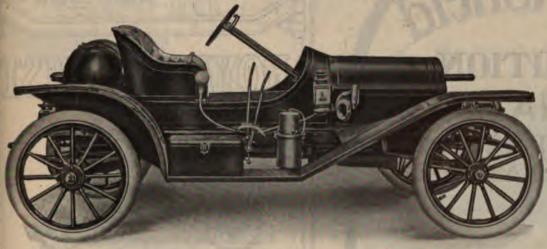
March 9—Boston Show Number

Our Show Numbers will contain, in addition to the regular department matter, stand to stand reports of the respective shows, general articles on the shows, and a number of special articles on tendencies in construction as revealed by the latest models exhibited. Written by experts on our staff.

All these articles will be fully illustrated. The news in connection with the shows will be thoroughly covered.

Reservations for advertising space in these Special Show Numbers' should be made at once.

# COOLED CAMERON CARS COOLED



Model 15, Price \$850.00

### NOTICE SPECIFICATIONS

4-Cylinder, 24 H. P. Wheel Base, 100 in.; weight, 1075 lbs.

3-Speed Selective type CAM-ERON patented trans-

Direct drive on all speeds. Splitdorf High Tension Mag-neto and Batteries.

Dual System.

Automatic Oiling System. Force gear driven pump.

Tires 32x3, front and rear.

Five lamps, generator, horn, tools.

Standard color Brewster Green; optional Twentieth Century Red. Artillery Wheels, optional Wire Wheels, Tangent Spokes.

Top, full mohair, \$60.00. Folding Wind Shield, \$40.00.

An Ideal Car for Business Men, the Doctor, Merchant, the man that wants to go and come in a hurry anywhere at any time. It is the car that is always ready.

This is only one sample of our line, that includes Runabout, Roadster and Touring Car in both 4 and 6 cylinder types, ranging from \$850 to \$1,500.

Our Six Flyer at \$1,250 is the wonder of the seeson.

Think it over and Write for Agency and Territory Proposition.

CAMERON CAR COMPANY, Beverly, Mass.

Works: BEVERLY, MASS .: NEW LONDON, CONN.

# You Feel That Life Is Worth Living

WHEN YOUR CAR IS EQUIPPED WITH A

# SPLITDORF MAGNETO



All ignition troubles absolutely eliminated. spark of the most intense heat that never fails under the severest and most trying conditions. In short, the Most Efficient and Most Satisfactory Ignition Device ever produced. Ask any user.

> Made by the oldest and foremost Ignition Specialty firm in America.

Don't fail to see it at the Grand Central Palace Show-Space 119.

Chicago: 319 Michigan Avenue

San Francisco: 520 Van Ness Avenue

## C. F. SPLITDORF

WALTON AVE. and 138th STREET Branch, 1679 Broadway

NEW YORK

868 Woodward Avenue

Boston: Motor Mart





This magneto will prevent your worrying over your ignition, as it is always right.

Never failing to properly fire the charge, getting the greatest possible power out of the motor with the greatest economy of

Gives a strong flash at all times; not a feeble spark. Is mud, water and oil proof.

If you wish to get the greatest possible power out of your

magneto, use the Pittsfield Magneto Spark Plug.

It has two separate sparking points. Soot will not collect on them and they are oil and water proof.

Pittsfield Switches will prevent anyone stealing your car, as they are burglar proof and water proof, never failing to

The Pittsfield Spark Coil leads all others in

speed, economy and efficiency, never getting out

Further information on





# Pittsfield Spark Coil Co. DALTON, MASS.

Sales Representatives: New England—W. J. Connell, 36 Columbus Ave...
Boston: Atlantic States—Thos. J. Wetzel, 17 W. 42d St., New York: Central
States—K. Franklin Peterson, H. V. Greenwood, 166 Lake St., Chicago:
Michigan—L. D. Bolton, 319 Hammond Building, Detroit: Pacific Coast—
The Laugenour Co., San Francisco.

A full line of Pittsfield Ignition Goods for sale by

H. V. GREENWOOD, 166 Lake Street, Chicago, III





# It is a Fact

that the ROYAL TOURIST possesses more essential mechanical features-o the proven-out kindthan any motor car or the market.

# The Test of Service Is All We Demand

Send for our catalog of th Model "M" Series Two, cor taining a description of th exclusive oil filtration system and other new details.

# The Royal Tourist Car C

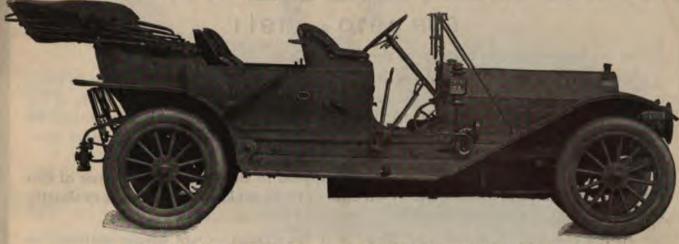
Member American Licensed Automobile Manufacture Licensed under Selden Patent.

Main Office and Factory, Cleveland, Branches { 1253 Michigan Ave., Chicago Broadway & 62nd St., New York

# Pierce-Arrow for 1910

Equipped with Cork Inserts

59 other manufacturers will use Cork Inserts for 1910 in 60,000 cars See that your Car is so equipped



### PIERCE-ARROW MOTOR CAR CO.

The National Brake & Clutch Co., Boston, Mass.

Gentlemen: We are very pleased to advise you of the success we have had in the use of leather faced cone clutches and we are free to admit that much of this success is due to the Cork Inserts. These enable the clutch to engage more gently and aid materially in the transmitting of the full power. The leather on the clutch does not readily burn when the clutch is allowed to slip, as most of this slipping is done on the cork, the clutch being then almost disengaged. We will continue to use this type of clutch for 1910 and long after that time unless something is brought out which is much better than anything at present in use for this purpose.

PIERCE-ARROW MOTOR CAR COMPANY HENRY MAY, Vice-President,

NO MATTER WHICH ONES YOU STARTED ON FINISH ON THE TIRES THAT

# WEAR LONGEST



Call on us at the New York, Chicago or Boston Shows and let us demonstrate our

# REMOVABLE RIM

Tire Company

BRANCHES AND AGENCIES THROUGHOUT UNITED STATES AND CANADA Factory, TRENTON, N. J., U. S. A.

There is no doubt but what the demand for

# DETACHABLE RIMS

FOR 1910 AND 1911

will be the largest in the history of the Motor Car.

Being the Pioneer Rim Makers of America, and having manufactured nearly every type of Detachable Rim that has been put on the market, and thru our close study of the rim business we have fully realized the objectionable features in their design, we are now about to announce a new—yet what we are convinced will be the most satisfactory—type of Detachable Rim yet placed on the market.

The features of this new production will appear in the February 2d issue of this paper, which will be in ample time, as we expect to be making deliveries very shortly thereafter, and in sufficient quantities to satisfy the demand.

As this is a subject in which all Motor Car Manufacturers are deeply interested we urge you to wait for further developments before specifying your rim equipment for 1910 cars.

Western Representative: L. F. McCLERNAN. 1084 Monadnock Block. CHICAGO.

9

The Standard Welding Co.

Eastern Representative: L. D. ROCKWELL, United States Express Bldg, NEW YORK



Wrapped Tread Quick Detachable to fit all Q. D. Rims.

# Swinehart Pneumatic Tires and Tubes

Distinguished by quality, made by men of experience and thorough knowl-



Wrapped Tread Clincher.

edge of tire manufacture, and sold by a company of established reputation. You cannot afford to accept a cheaper make.

Insist on Swineharts

We have the best proposition ever offered for one good agent in each city on



Truck Tire and Bolted on Flange Rim.

# Swinehart

Solid and Pneumatic Tires

SEE OUR EXHIBITS AT THE SHOWS.

Swinehart Tire & Rubber Co.

AKRON, OHIO

NEW YORK, 575 7th Ave.

CHICAGO, 1720 Michigan Ave.



Most Secure Fastening for Heavy Work.

# The Find of the Season

A High Grade

35 H. P.

Car, with

116 inch Wheel Base

Price

\$1400.00

f. o. b. Factory



Remy Model S Dual System Magneto, Five lamps and Prest-O-Lite Gas Tank included with regular equipment

WRITE FOR COMPLETE SPECIFICATIONS AND AGENCY PROPOSITION.

### THE INDIANA MOTOR SALES COMPANY

General Sales Agents

Offices, 505 Oddfellow Building, Indianapolis, Ind.

INDIANA MOTOR & MFG. CO., Manufacturers, FRANKLIN, INDIANA



# Baldwin Improved Detachable Chain

Is in favor with the public because the length can be altered easily; it can be repaired without delay; it is just as good as a riveted chain. We also make riveted chains in all sizes,—prices the same.

SPROCKETS

on order. Attractive prices in large quantities.

# BALDWIN CHAIN & MFG. CO. WORCESTER, MASS.

Agents: H. V. GREENWOOD, 166 Lake St., Chicago, Ill.
M. A. BRYTE, 718 Mission St., San Francisco, Cal.
C. J. IVEN, Rochester, N. Y.

# Good for Running Auto= mobiles, Airships, Shop Tools and Other Machines

where every bit of the power is needed and where absolute dependability is es-



# DIAMOND CHAINS

long ago proved themselves the only reasonable priced drives that could stand the hard knocks of automobile service, they proved their speed and power on winning cars of the most important races, and the Wright Brothers considered them dependable enough to place on the world's greatest flying machines.

Try one Diamond Chain and you will soon discover

that it is the most economical and satisfactory chain you have ever used.

The **rolling** of a chain into mesh saves power over the grinding action of gears, but gives the same positive drive.

In other words a Diamond Chain converts into useful work a large percentage of the power that with other drives tends to wear out vital parts. This alone would make a Diamond Chain drive desirable, but considering that it does its work better, lasts longer, and costs less than gear drive, you can't afford to neglect investigating.

Diamond Chains have been the Standard ever since we originated the chain industry in America twenty years ago. Don't accept a substitute. If your dealer won't furnish Diamond Chains, write to us.

# Diamond Chain & Mfg. Co.

245 W. Georgia Street, Indianapolis, Ind.

Capacity 8,000,000 feet per year.

### 58

# AUTOMOBILE SPRINGS



# Scientifically Tempered

### Heat Treatment

In tempering our Automobile Springs we use specially constructed gas-heated kilns, which can be kept at a uniform temperature of any desired degree and in which the steel bars never come in direct contact with the flame. The steel is also subjected to a series of baths in oil heated to the proper degree.

### Result

The result is that we obtain springs that are full of life and elasticity, yet are so tough and strong that they stand the hardest usage or abuse and can be depended upon in emergencies.

There is no comparison between springs tempered by our Method of Heat Treatment and springs which are merely flashed in oil or chilled with water.

## Steel Used

The steel we use is either Chrome Vanadium, the best steel made for springs, or our Special Analysis Steel, which is far superior to the ordinary carbon steel, which is still being used by some automobile spring makers. Both a physical and chemical test is made before using, and unless it conforms to rigid requirements the steel is rejected.

## Fitting and Tests

All of our Automobile Springs are hand fitted and tested at every step of their manufacture.

## **Deliveries**

We are enabled through increased facilities to promptly execute orders.

THE

Cleveland-Canton Spring Co.
Canton, Ohio

# IF YOU BUY OR MAKE



Machined, bone hardened, ground bolts, known as Front Axle Yoke or King Bolts, and other styles of ground bolts and shafts or machine finished bolts and screws in the larger sizes, and do not get them from us, then you are undoubtedly missing a margin of saving that could be yours as well as not—and also too—you can get rid of the bother of making them.

Give us a try-out on these lines, and Valves and Yoke End Rod assemblies.

Take it from us or some of our customers—you'll not regret it.

The Electric Welding Products Co., Cleveland, Ohio

# G&JIRES

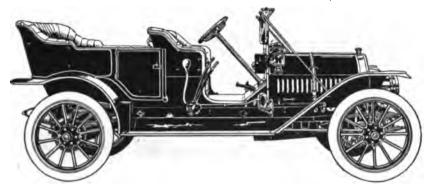
The safest and surest way to get your money's worth in tire service is to equip your car with G & J Tires.



No other tires on the market can offer a greater margin of safety. No other tires will show as low cost per mile.

G & J TIRE CO. Indianapolis, Ind.

Detroit Chicago New York San Francisco Denver Buffalo Philadelphia St. Louis Los Angeles Minneapolis Omaha Boston Portland, Ore. Cleveland Pittsburg Kansas City Atlanta Toledo



# JACKSON

Model "30," \$1,250 Five Passenger Touring Car, Four cylinder—4x4. 105 inch wheel base and 32 inch wheels.

Model "40," \$1,700 Five Passenger Touring Car, Four cylinder—
4%x4%. 110 inch wheel base and 34 inch wheels.

Model "50," \$2,350 Seven Passenger Touring Car. Two extra seats, \$50 additional. Four cylinder—4½x4½. 120 inch wheel base and 36 inch wheels.

JACKSON AUTOMOBILE CO., JACKSON, MICH.
Members A. L. A. M. Licensed under Selden Patent.

DISTRIBUTORS—JACKSON MOTOR CO., 1663 Broadway, New York City: RALPH TEMPLE AUTO CO., 1219 Michigan Ave., Chicago; JOHN DEERE PLOW CO., St. Louis, Mo.; B. P. BLAKE, Boston, Mass.; CHAS. H. CHILDS & CO., Utica, N Y.; C. D. PAXSON, Cleveland, Obio; JOHN DEERE PLOW CO., Dallas, Tex.; JACKSON MOTOR CO., Minneapolis, Minn.; JACKSON MOTOR CO., Kansas City, Mo.

# SOLID CAM SHAFTS



The Solid Cam Shaft has come to stay, and the motor builder who uses the assembled kind is becoming a back number. The Solid Shaft is better and costs no more. We will make Shafts to your specifications, make them right and give you good deliveries.

Muskegon Motor Specialties Co., Muskegon, Mich.



WEIGHT, 20 Lbs.

LOW TENSION WITH HIGH TENSION DISTRIBUTER

# HEINZE NEW MAGNETO

Will generate a large spark firing charges positively when cranked or running at a low speed. At 50 R. P. M. will produce a 3/8 in. spark. At 1,000 R. P. M. the primary voltage is 6.8. Its short circuit currents amount to 5.7 amperes. All parts are waterproof. Let us send you catalog giving full information.

HEINZE ELECTRIC COMPANY

LOWELL, MASSACHUSETTS

# Standard Connecting Rod Company

Manufacturers of Finished Connecting Rods, Crank Shafts, Etc.

Of course it is dangerous to take chances with a crank, oftentimes expensive. Furthermore, it is unnecessary. We know how, and we have facilities to produce cranks that will relieve you of trouble, labor and vexatious delays. It is surprising how satisfactory a first-class crank can be when made by us. If you are looking for strictly high-grade crank shafts, made from the best



tory a first-class crank can be when made by
us. If you are looking for strictly highgrade crank shafts, made from the best
quality of material, with all cylindrical parts ground true to sizes, finished ready for use, send detailed drawings or blue prints, stating
quantities, for prices.

STANDARD CONNECTING ROD COMPANY, Beaver Falls, Pa., U.S.A.

# THE McCUE AXLE. Model X

Full floating type axle with annular ball bearings and self-seating thrust ball bearings.

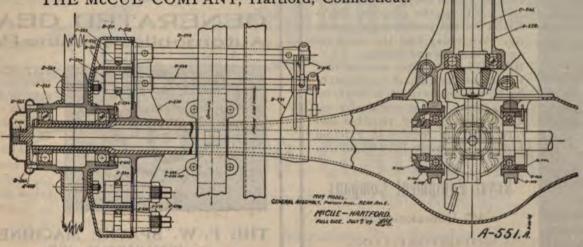
The driving shafts have integral hub clutches—not welded—and are made of .45 carbon steel, heat treated. Two 10 inch and two 14 inch brake drums are operated by four cam shafts connected to equalizers under the body of the car. The brakes are adjusted by the short cam shafts at rear of axle, as shown in line cut.

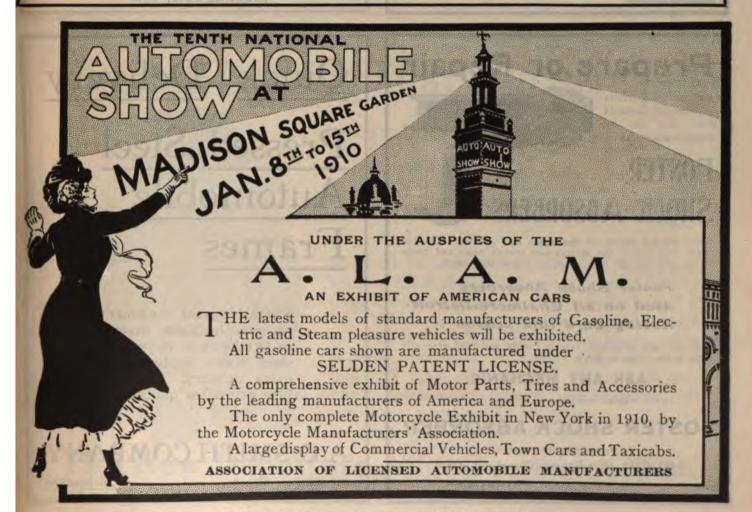
The Hub flanges are accurately machined, also the wheel-bearing surface of the drums making it possible to assemble perfectly true running wheels.

The spring seats are made either to swivel on a bushing or to key permanently to the axle. By removing the hub caps and taking out the floating axles, the gear case with differential and bearings can be quickly removed by taking out twelve bolts.

Torsion rods and torsion rod bolts will be furnished when wanted. This axle is intended for cars of 2,500 pounds weight and under.

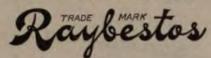
THE McCUE COMPANY, Hartford, Connecticut.





THE BEST

# Brake Lining-Friction Facing



It is impossible to make a better or more efficient Friction Facing than RAYBESTOS. In competitive tests with every known material used for the purpose, RAY-BESTOS has proven its superiority. We today lead the entire industry in merit and quality. RAY-BESTOS has greater wearing life. Possesses the highest coefficient of friction, is impervious to heat, oil or gasolene and is practically indestructible - every possible fea-ture that you require in Friction Facing is found in RAYBESTOS.

# Royal Equipment Company

163 Housatonic Ave.

BRIDGEPORT, CONN.

# SPACKE SUPERIORITY RECOGNIZED

in the production of Automobile Machine Parts and Finished Die-Cast Bearing Bushings.

#### FINISHED DIE-CAST BUSHINGS

OUR SYSTEM enables us to give you a better bearing at a consider-

OUR CUSTOMERS are the most prominent builders in the trade.



### GENERATED GEARS **Automobile Machine Parts**



PISTONS PISTON RINGS PISTON PINS MOTOR GEARS TRANSMISSIONS TRANSMISSION GEARS

All to your specifications.

Let us figure with

THE F. W. SPACKE MACHINE CO. INDIANAPOLIS, IND.

# Prepare or Repair

Prevent tire troubles and get full comfort from your car by equipping it with



which do not throw all the shock and wear on tires, but allow free play to the springs over smooth roads and pavements, and only get busy when you strike the bumps.

Foster Shock Absorbers used on all Chalmers Detroit Racing Cars this season

Built on right principle, free in centre and bind gradually going up and coming down.

### ASK ANY MECHANIC

Agents wanted everywhere. Write for book.

### FOSTER SHOCK ABSORBER

Home Office and Pactory

1413 East 4t0h Street, Cleveland, Ohio

Branch, 1926 Broadway, New York City

# Quick Delivery

# Pressed Steel Automobile Frames

Extensive press equipment recently installed enables us to take on more pressed steel frame business for quick delivery. Send us blue prints for quotations.

### A.O. SMITH COMPANY

245 Clinton Street

Milwaukee

# OPENS NEW YEAR'S EVE

325 EXHIBITORS

DEC. 31 to JAN. 7

Leading American Cars All Foreign Cars All Accessory Makers

> Finest Decorations by Unitt & Wickes ever

> offered at any Motor Car Exhibition

Taxicabs

Commercial Vehicles



Management of American Motor Car Manufacturers' Association

GRAND CENTRAL PALACE

FORTY-THIRD ST. AND LEXINGTON AVE., NEW YORK

Admission, 50c.; Tuesday, \$1.00

# The Ball Bearing That Is in Demand



The New Departure
Two-in-One
Annular Ball Bearing

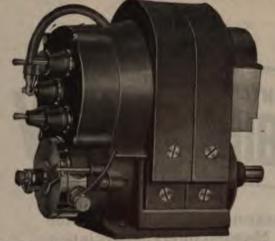
meets the requirements of automobile manufacturers so successfully that it has been adopted for fifty models of 1910 cars.

Without departing from the simplicity which characterizes the single row type, this bearing offers valuable advantages. It carries radial and thrust load with equal efficiency. Its two rows of balls greatly increase its capacity and durability. It economizes space, weight and labor.

Write for catalogue-treatise today.

The New Departure Mfg. Co., Bristol, Conn.

# New Pfanstiehl Magneto

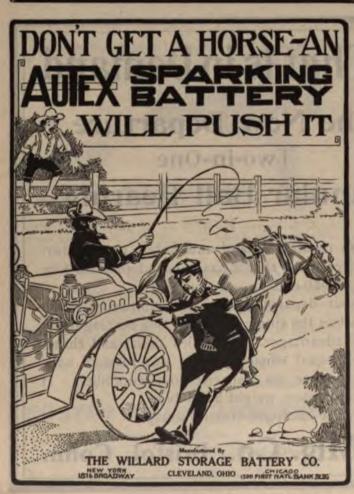


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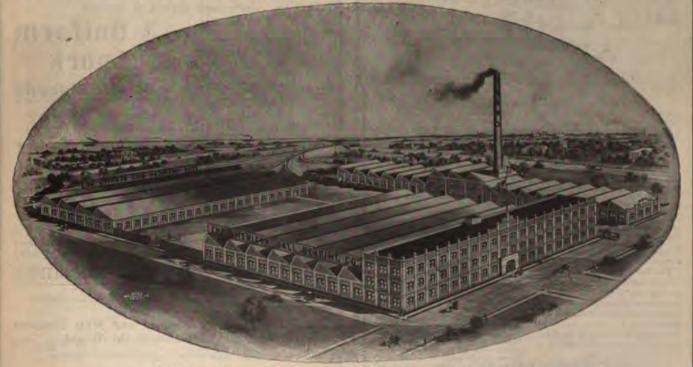
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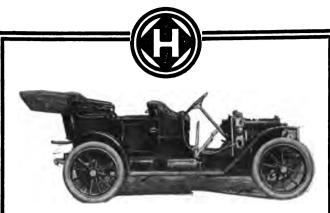
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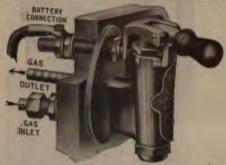
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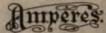
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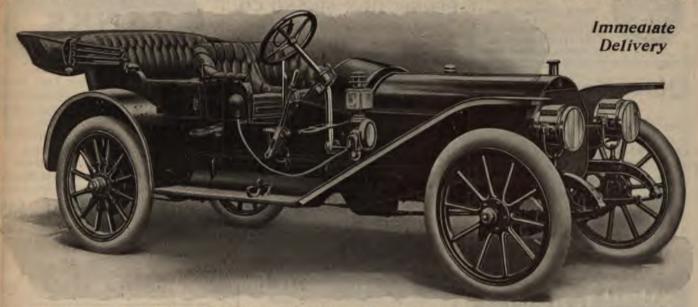
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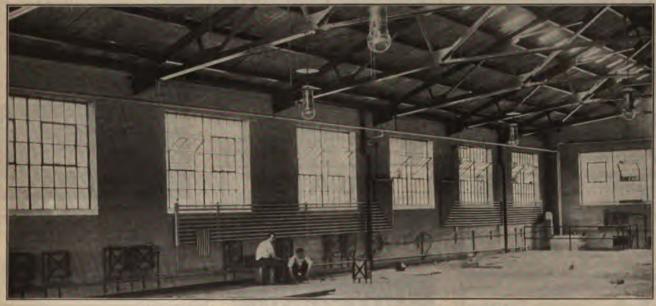


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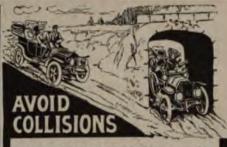
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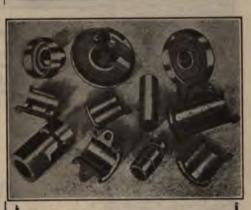
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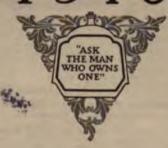
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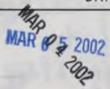
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